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Review Article

COMBATING MALARIA IN NIGERIA THROUGH MALARIA EDUCATION IN SCHOOLS AND COMMUNITIES

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DOI: 10.7897/2321-6328.01214

Article Received on: 16/06/13

Accepted on: 17/08/13

Abstract

Goal four and six of the Millennium Development Goals (MDGs) is to reduce child mortality and combat malaria. The achievement of these goals in Nigeria since its launch has been tremendous by the statistic available. There has been a sharp decrease in malaria prevalence rates. Nationwide distribution of 72 million long-lasting insecticide-treated bed nets, although only in its initial stages, protected twice as many children (10.9 per cent) in 2009, compared to 2008 (5.5 per cent). Progress in reducing child mortality has been rapid also. Under-five mortality has fallen by over a fifth in five years, from 201 deaths per 1,000 live births in 2003, to 157 deaths per 1,000 live births in 2008. In the same period, the infant mortality rate fell even faster, from 100 to 75 deaths per 1,000 live births. With un-sustained effort and lack of improvement in related and lagging sectors, such as water and sanitation. The latter, which is a pre-requisite for the spread of the deadly disease plaguing Nigeria called malaria. Malaria is spread from an infected person to a healthy person by a bite of the Anopheles mosquito which breeds in flirty environment. About 3.3 billion people – half of the world's population – are at risk of malaria. In 2010, there were about 219 million malaria cases and an estimated 660 000 malaria deaths. Increased prevention and control measures have led to a reduction in malaria mortality rates by more than 25 % globally since 2000 and by 33 % in the WHO African Region. People living in the poorest countries such as Nigeria are the most vulnerable to malaria. In 2010, 90 % of all malaria deaths occurred in the WHO African Region, mostly among children under five years of age.

Keywords: Malaria, Malaria education, Nigeria, MDGs, Malaria eradication.

INTRODUCTION

The United Nations has earmarked 2015 as the year to end death from malaria. Two and a half years to this deadline, it is estimated that over 300,000 Nigerians, mostly children, die yearly from malaria¹. Minister of Health, Professor Onyebuchi Chukwu was reported in 'The Nation' Newspaper¹ seeking \$270 million to eradicate the disease. Each day, the waiting halls at Hospitals in Nigeria swell by early morning. The bulk of patients waiting to see doctors, especially children, are suffering from malaria and could die in 24 h without prompt attention and effective treatment.¹ quoted a pediatrician at a Specialist Hospital in Bauchi to have said that: "Sixty per cent of the deaths in that hospital, especially children's, are caused by malaria, Of 525 deaths resulting from at the Specialist Hospital this year, the doctor said about 65 were children under five". Luis Benavente is the Director of Improving Malaria Diagnostics, a United States Agency for International Development-Supported Organization, was reported in The Nation Newspaper of 3rd November, 2011 to have said that for the world to overcome malaria, it has to defeat it in Nigeria because its citizens are the largest exporters of malaria in the world – 'Nigeria is the biggest exporter of malaria in the world and it can only be reduced if it is controlled in Nigeria'. This is because Nigerians are very enterprising and travel a lot to other countries to transact businesses. Unknowingly, they spread malaria parasites wherever they go. He said for the world to

control malaria, it must first be eradicated in Nigeria. The premise of his argument will only be true if there are female anopheles mosquitoes to transmit the malaria parasite by biting an infected person and transmitting it to a healthy person. An environment devoid of mosquitoes will eventually eradicate malaria disease. This is the message of combating malaria through malaria education. Nigeria, Africa's most populous country, faces the challenges of a petroleum-based economy, ethnic and religious strife and widespread corruption. In the midst of economic deprivation, families have very little access to health care. With one of the world's highest fertility rates, the people in this country of contradictions have an average life expectancy of only 52 years². Widespread poverty, malnutrition, poor sanitation and limited access to clean drinking water compound the numerous health issues of the country. Some of these health issues include:

- Very high maternal and infant mortality with lack of prenatal care and shortages of basic medications among the leading causes of preventable death
- Very high risk of communicable disease such as: malaria, yellow fever, Hepatitis A and E, typhoid and diarrheal disease.

Communicable diseases are diseases that can spread from person to person in which malaria is one. Malaria is a tropical disease that sends shivers down the spine. There are millions

of people who are affected with this dangerous disease every year and a million who succumb to this illness. Malaria is the red blood cell infection caused by parasite protozoa called Plasmodium. This disease was first discovered by an Italian, Dr. Francisco Torti. This disease affected tropical as well as non-tropical countries. However, it was mostly eliminated from non-tropical countries during the 20th century. Malaria spreads from person to person by the bite of a female mosquito. The mosquito bites an infected person and transfers the protozoa into the blood of a healthy person during a meal.

Nigeria National Malaria Control Program: A Report from Carter Center Atlanta Georgia

Nigeria alone accounts for a quarter of the malaria burden in Africa. Malaria is endemic in Nigeria, with seasonal peaks during the rainy season. Almost 100 % of the population is at risk for malaria infection and approximately 50 % of the population will experience at least one episode each year³. Malaria accounts for an estimated 66 % of all health facility attendance and is responsible for 30 % of deaths among children and 11 % of maternal mortality in Nigeria³. The social and economic burdens of malaria are also significant: malaria reduces the GDP of Nigeria by approximately 1 % annually and is the leading cause of absenteeism at work. The vision of the Nigerian National Malaria Control Program (NMCP) is a malaria-free Nigeria which is in line with the author's advocacy but in the author's view this can be achieved through malaria education on malaria-vector-control rather than just the distribution of Insecticide Treated Nets (ITN) and Long Lasting Insecticide Nets (LLINs). Emphasis of the advocated malaria education as proposed in this write up is on clean environment to avoid mosquito breeding. The fight against malaria should be the fight against mosquito breeding not just preventing mosquito bite. The 2009-2013 NMCP Strategic Plan set ambitious targets of eighty percent of households owning at least two ITN, eighty percent of children under-five and pregnant women sleeping under an ITN, hundred percent of pregnant women attending antenatal care receiving at least two doses of intermittent-preventive therapy (IPTp) and a fifty percent reduction in malaria morbidity and mortality. Baseline data for evaluating progress towards the goal of reducing malaria-related morbidity and mortality by fifty percent were collected during a 2010 National Malaria Indicator Survey (MIS). This was the first national survey to assess malaria prevalence using rapid diagnostic tests and microscopy; previous demographic and health surveys had used fever in the past two weeks as a proxy for malaria. The final weighted results of the survey have not been released, but preliminary analyses suggest that prevalence of malaria is approximately fifty percent in children six months to five years of age and that insecticide-treated household net ownership is still well below the national target of eighty percent.

The Science of Malaria

The knowledge of the science of malaria is important because of the erroneous conception of the spread of malaria. There are four species of *Plasmodium* that can cause malaria. Each species of the protozoa exhibit slightly different symptoms in the infected patient. These four species are: *Plasmodium falciparum*: the most common parasite that affects millions of people in Africa, South East Asia as well as South America.

It is said to be the deadliest parasite that leads to the majority of deaths. Those infected with *Plasmodium falciparum* show the following signs of infection: dizziness, fatigue, abdominal pains, muscular pains, joint pains, vomiting and fever etc. One needs immediate treatment for this infection or else the disease may affect the central nervous system. This may lead to complications such as convulsions, loss of consciousness as well as paralysis⁴. *Plasmodium vivax*: is the most common species of Plasmodium found around the world. This parasite causes a minor illness and deaths are very rare. Some of the symptoms caused by *Plasmodium vivax* are as follows: diarrhea, chills, fever and fatigue.

Plasmodium ovale

It is a very rare species of the parasite *plasmodium*. It is found in the African region. *Plasmodium ovale* causes symptoms similar to *Plasmodium vivax*. It can cause a relapse and infect the red blood cells in a few months to years in a cured patient. This is because the parasite tends to live in the liver of the patient. The fourth specie of plasmodium is the *Plasmodium malariae*. This causes the least number of infections worldwide. An infection with *Plasmodium malariae* causes high grade fever and chills.

Causes of Malaria

Malaria is spread from an infected person to a healthy person by a bite of the female Anopheles mosquito. The female Anopheles mosquito spreads the parasite during a meal through its saliva. The sporozoites then travel towards the liver through the blood. Here, they mature and enter the bloodstream as merozoites. They invade the red blood cells and continue to multiply. After about 24 to 72 h, the cell lyses and releases more of the parasites into the blood. It is at this point, when the infected person starts showing signs of infection. Also, if a mosquito bites a person during this stage, it can pass the parasites to another healthy person. Malaria treatment requires hospitalization, especially in case of infection by *Plasmodium falciparum*. Malaria is most commonly transmitted through the bite of an infected anopheles mosquito although it can be transmitted by blood transfusion, and in rare instances, by contaminated needles and syringes. In congenital malaria, parasites are transmitted from mother-to-child before and / or during birth. Anyone can get malaria. However, people who are heavily exposed to the bites of mosquitoes infected with *Plasmodium falciparum* are most at risk of malaria⁵. People who have little or no immunity to malaria, such as young children and pregnant women are more likely to become very sick and die. School-age children can also be at risk of infection and disease. Malaria may cause anemia and jaundice (yellow colouring of the skin and eyes) because of the loss of red blood cells. Infection with *Plasmodium falciparum*, if not promptly treated, may cause kidney failure, seizures, mental confusion, coma, and death. The clinical diagnosis of malaria is difficult under the best of circumstances. Definite diagnosis is based on light microscopic observation of parasites in the red blood cells of the patient. Newer diagnostic tools include antigen detection in the form of a dipstick, known as rapid diagnostic tests⁶.

National Malaria Control Plan (NMCP) and Strategy

The 2009-2013 National Malaria Control Strategic Plan is based on the National Health Sector Development

Framework and Strategic Plan and is in line with national health and development priorities. The overall objectives of the strategic plan for the period 2009-2013 are to:

- Nationally scale up for impact a package of interventions which include appropriate measures to promote positive behavior change, prevention and treatment of malaria;
- Sustain and consolidate these efforts in the context of a strengthened health system and establish a basis for the future elimination of malaria in the country.

The plan has a goal of reducing malaria-related mortality in Nigeria by fifty percent by 2013. The coverage targets for malaria prevention interventions were not reached by December 31, 2010, so NMCP has reset the target date to 2013. By December 31, 2013, the targets are:

- At least eighty percent of households will have two or more ITNs (Insecticide Treated Net);
- At least eighty percent of pregnant women and children under five years old sleep under an ITN;
- Twenty percent of households nationwide covered by Indoor Residual Spraying (IRS);
- At least eighty percent of pregnant women attend antenatal services and sixty percent receive two dose of Intermittent Preventive Therapy in Pregnancy (IPTp);
- At least eighty percent of patients with fever attending health facility receive an appropriate diagnostic test and are effectively treated according to the national treatment guidelines by 2013.

The inculcation of the knowledge and understanding of the etiology and prevention of malaria is not one of the targets / strategies of NMCP for the eradication of malaria in Nigeria which is a flaw in the fight against malaria and makes the eradication process clumsy and seems to take forever. Generally, people like being involve in matters concerning them if they have understanding of why and how things concerning them are done. This paper advocates that the basic teaching of malaria (its causes and prevention) in schools and communities is equally important if the eradication of malaria is to be achieved. The intervention strategies of NMCP are prevention as well as treatment as it

involves the Federal Government distribution of free LLINs, ITNs, IPTp, IRS, the use of RDT (Rapid Diagnostic Test), treatment of uncomplicated malaria with ACTs (Artemisinin-based Combination Therapy), and the use of pre-referral treatment of severe malaria (using applicable medications, such as artemisinin rectal suppositories) at peripheral health facilities; but neglecting the strategy of malaria education which in combination with the above strategies will yield a better and more efficient result. Prevention strategy of malaria eradication cannot be complete within malaria education which involves educating the masses of the causes and effective ways of preventing malaria which should start from clean surroundings and effective environmental sanitation to avoid breeding grounds for mosquitoes.

Current Status of Malaria Indicators in Nigeria

In Nigeria as reported by Nigeria Malaria Operation Plan⁷ the most up to-date information on the status of malaria control efforts in Nigeria comes from the 2010 Nigeria Malaria Indicator Survey (MIS), preliminary report, which was completed in December 2010. A total of 6,344 women aged 15-49 were interviewed and included 6,234 children under the age of five years. Malaria prevalence based on microscopy (laboratory examination) indicated that forty-two percent of children aged 6-59 months had malaria parasites. Parasites parasitemia (occurrence of malaria parasites in the blood) was higher in rural areas (forty-eight percent) than urban areas (twenty-two percent) and decreased as a mother's educational level improved. Geopolitical zonal variations of indicators were also reported. The highest malaria prevalence zones were South West (fifty percent), North Central (forty-nine percent) and North West (forty-eight percent), while the lowest prevalence zones were South East (twenty-eight percent), North East (thirty-one percent) and South-South (thirty-two percent). ITN ownership was highest in the South West (twenty percent). The Table below shows a national survey carried out in 2008 by Demographic Health Survey (DHS) and in 2010 by Malaria Indicator Survey (MIS) on some malaria indicators. It compares percentages of responses in 2008 and 2010 on nine malaria indicators.

Table 1: Malaria Indicators

Malaria Indicators	Estimated National Coverage (2008) DHS	Estimated National Coverage (2010) MIS
Proportion of households with at least one ITN	8.0 %	41.5 %
Proportion of children under five years old who slept under an ITN the previous night	5.5 %	29.1 %
Proportion of children under five years old who slept under an ITN the previous night in a household with an ITN	49.8 %	59.0 %
Proportion of pregnant women who slept under an ITN the previous night	4.8 %	33.7 %
Proportion of pregnant women who slept under an ITN the previous night in a household with an ITN	44.4 %	65.6 %
Proportion of children under five years old with fever in the last two weeks who received treatment with ACTs within 24 hours	1.1 %	3.2 %
Proportion of children under five years old with fever in the last two weeks given any anti-malarial within 24 hours that received an ACT	7.0 %	12.0 %
Proportion of women who received an anti-malarial drug during their last pregnancy leading to a live birth within the previous two years	18.4 %	39.6 %
Proportion of women who received two or more doses of IPTp during their last pregnancy leading to a live birth within the previous two years.	4.9 %	13.2 %

Malaria Education in Schools

This article advocates that malaria should be taught in the entire educational pyramids (primary to tertiary level), its causes and prevention. It should be included in the general / basic science curriculum of primary schools, integrated science curriculum of basic junior secondary schools, health / biology curriculum of senior secondary schools and general studies curriculum of tertiary institution. In an empirical study on 'school-based participatory health education for malaria control in Ghana: engaging children as health messengers was carried out by⁸. The study was conducted in the Dangme-East district of the Greater Accra Region, Ghana, between 2007 and 2008. Trained school teachers designed participatory health education activities and led school children to disseminate messages related to malaria control to their communities. Three schools and their respective communities were chosen for the study and assigned to an intervention group (one school) and a control group (two schools). Questionnaire-based interviews and parasitological surveys were conducted before and after the intervention, with the intervention group (105 children, 250 community adults) and the control group (81 children, 133 community adults). Chi-square and Fisher's exact tests were used to analyze differences in knowledge, practices, and parasite prevalence between pre- and post-intervention. It was found that after the intervention, the misperception that malaria has multiple causes was significantly improved, both among children and community adults. Moreover, the community adults who treated a bed net with insecticide in the past six months, increased from 21.5 % to 50.0 % ($p < 0.001$). Parasite prevalence in school children decreased from 30.9 % to 10.3 % ($p = 0.003$). These positive changes were observed only in the intervention group. Ayi *et al* study suggests that the participatory health education intervention contributed to the decreased malaria prevalence among children. It had a positive impact not only on school children, but also on community adults, through the improvement of knowledge and practices. They recommended that the strategy can be applied as a complementary approach to existing malaria control strategies in West African countries where school health management systems have been strengthened. The emphasis of malaria education to citizenries in malaria prone countries as complementary strategy in the fight against malaria cannot be over-emphasized. Apart from the provision of services and items for the treatment and prevention of malaria, government through Ministries of Education should make it compulsory for the teaching and learning of malaria in schools as a complementary control strategy.

Malaria Education in Communities

It has been discovered⁷ that improvement in mothers' education decreased rural parasitemia of malaria (the number of rural dwellers that had malaria parasite in their blood stream after a microscopy examination). This implies that as mothers gain understanding and increase in knowledge; the chances of their children and family having malaria parasites in their blood stream reduced⁹. The consequent of this is that if rural mothers are taught the causes and subsequent prevention of malaria in the form of maintaining a clean surrounding and good environmental sanitation it will go a long way in reducing the amount of mosquitoes locking around. Educating the community on environmental

sanitation i.e. keeping their surroundings clean, emptying every container that would hold water as a result constituting a breeding ground for mosquito larvae, clearing of bushes, ensuring that drainages are clean as first line management of vector-control mechanism will go a long way in combating the scourge of malaria. The distribution of ITNs and LLINs and even IRS can be a secondary and additional measure to the fight against malaria. Community malaria education can be done through workshops and seminars in town halls where specially trained health educators will bring down to the level of understanding of the community population the knowledge of malaria, its causes and control. This can be done by grouping them according to their intellectual ability and making the knowledge to be learned intellectual-specific. Local examples can be use in conveying the malaria education.

CONCLUSION

The strategies that the Government (Nigeria National Malaria Control Program – NNMCP) is using for the prevention of malaria involve distribution of Insecticide Treated Nets (ITN) and medication (anti-malarial drugs) as treatment and preventive therapies are inadequate and incomprehensive in the fight against malaria. This is because owning of insecticide treated net does not translate to using it. That is why even if the national target of 80 % ownership of ITN is achieved that might not eradicate malaria in the country. The strategy advocated in this paper is the malaria-vector-control strategy which hinge on educating the people on the elimination of malaria vector (mosquito) thereby breaking the chain of transmission. Another aspect of malaria education advocated in this paper is educating the people on the science of malaria – how it is transmitted and prevention of malaria by breaking the chain of infection which is eliminating the vector – mosquito by keeping their surroundings clean to avoid stagnant water and bushes which in turn avoid breeding grounds for mosquitoes. What is Government doing about educating its citizenry on causes of malaria and prevention in terms of environmental sanitation and keeping their surroundings clean? The future must lie in developing greater collaboration between schools and communities where the role of understanding malaria by the people is seen and valued as an integral component within the fight against malaria in Nigeria.

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Cite this article as:

Joy-Telu Hamilton-Ekeke. Combating malaria in Nigeria through malaria education in schools and communities. *J Biol Sci Opin* 2013; 1(2): 93-97 <http://dx.doi.org/10.7897/2321-6328.01214>

Source of support: Nil; Conflict of interest: None Declared