

TANZANIA has embarked on campaigns dubbed as 'Roll back Malaria' and 'malaria haikubaliki' which motivated citizens to use various preventive measures to prevent themselves against malaria infections.

The campaign is due to realization that this disease has significant impact on this country's manpower which eventually hinders social and economic production functions. In Africa malaria is the biggest killer of children under five years old, who account for with nearly 90 percent of all malaria deaths. It is estimated that a child dies every minute from the disease.

This disease is caused by protozoan parasites belonging to the genus 'Plasmodium'. It is transmitted by several species of infected female 'Anopheles' mosquitoes. Differences in the distribution of mosquitoes and in the behavior of potential human hosts contribute to the variation in epidemiological patterns of malaria seen worldwide. The majority of malaria-attributed deaths occur in Sub-Saharan Africa, where children under the age of five and pregnant women are the most at-risk.

Young children are much more vulnerable to all forms of malaria. In infants this is because their immune systems are not yet fully developed, while in under fives they have not yet developed effective resistance to the disease.

Fernando, S.D and other authors of an article titled 'The impact of repeated malaria attacks on the school performance of children' states that the burden of malaria in the tropical world today is estimated to involve 300-500 million episodes of acute illness and more than one million deaths per year, mainly in African children. This amounts to the loss of about approximately 44 million disability-adjusted life years annually, a conspicuous drain on human health by today's standards.

However, by its adverse

long-term effects on trade, foreign investment, and commerce, the impact of malaria extends beyond its direct effects on human health to the economic development of nations, costing African countries approximately 1-2% of their Gross Domestic Product. Even these estimates, however, fail to account for effects that malaria has long been suspected to have on the mental and physical development of individuals exposed to it, which have contributed greatly to the impoverishment of regions and nations affected by this disease.

In spite of this continued wide prevalence of malaria in children, the effects of malaria on mental and cognitive development of children have hardly been evaluated in controlled studies. As part of public awareness on campaign against malaria, this article is going to discuss the impact of malarial infections on the school performance of children.

Can malaria have a devastating effect on children's education? Malaria Consortium website argues that pregnant women are far more vulnerable to malaria than other adults: they are four times more likely to contract and twice as likely to die from malaria as other adults. This is due to the typical immuno-suppression associated with pregnancy and increased levels of the hormones cortisol and oestrogen.

In Africa malaria in pregnancy is responsible for 400,000 cases of severe maternal anaemia and 200,000 newborn deaths each year. Placental infection, premature birth and low birth weight (a significant factor in infant mortality) are also caused by maternal malaria. In addition, severe maternal anemia increases the risk of perinatal complications. Malaria, therefore, is seriously hindering the achievement of MDG Goal 5 (improve maternal health).

Repeated infections cause



A nurse creating awareness on malaria disease (File OPoro)

children to miss large periods of school and anaemia, a side-effect of frequent malaria attacks, interferes with children's ability to concentrate and learn and causes chronic fatigue. Repeated illnesses from malaria can also exacerbate any malnutrition, which can both decrease the effectiveness of anti-malaria drugs and increase children's susceptibility to the other main killer diseases: diarrhoea and pneumonia.

A study of the Global Fund in Africa done by Maria Kuecken, Josselin Thuilliez, Marie-Anne Valfort which resulted into a paper titled 'Does malaria control impact education?' published on 30th May 2014, argues that there are a number of ways through which malaria can impact children's educational achievement.

First, malaria during pregnancy can lead to foetal

growth retardation which translates into cognitive and physical impairments among children. Barreca (2010) analyzes the long-term impact of 'in utero' and postnatal exposure to malaria. He finds that such exposure leads to considerably lower levels of educational attainment and higher rates of poverty later in life.

Second, during early childhood (under the age of five), 9 complicated forms of malaria may develop rapidly. The effects of severe malaria, better known as cerebral malaria, have been quantified by numerous studies. For instance, Ngoungou et al. (2007) provide a quantification of the burden in Mali. In this study, 101 subjects (mean age of 5.6 to 3.6 years) who had contracted cerebral malaria were followed from 1999 to 2001. The authors find that twenty-eight children

exhibited persistent neurological sequelae (26.7 percent). Among them, eight children had developed these sequelae just after cerebral malaria and 20 a few months later.

These included headaches, mental retardation, speech delay, buccofacial dyspraxia, diplegia and frontal syndrome (one case each), dystonia (two cases), epilepsy (five cases) and behavioral and attention disorders (15 cases).

Third, even during late childhood (typically considered to be from 6 to 16 years of age), the protection conferred by acquired immunity is only partial. If cerebral malaria is rare at this stage, 'simpler' cases of clinical malaria (called 'uncomplicated malaria'), repeated illness, or chronic malaria infections are not. They can have a non-cognitive impact on

educational achievement via school absenteeism, general health conditions, and investment in curative strategies (coping strategies against the disease detrimental to educational investments). For instance in a Kenyan case study, Brooker et al. in their study done in 2000 titled 'Situation analysis of malaria in school-aged children in Kenya - what can be done?' attribute 13-50 percent of medically-related school absences to malaria. In Mali, malaria was the primary cause of absenteeism during a full school year. Moreover, asymptomatic malaria has proven to have detrimental effects on children's cognitive and therefore educational skills.

Lihoya Chamwali in his PhD study titled 'The Economic Burden of Malaria in Tanzania' states that at household level, malaria

affects households in multiple ways starting from infant stage to adulthood. Malaria is more prevalent in pregnant women because of their weak immune system and if not controlled it can result into miscarriage. Also according to Barofsky et.al (2011) in their study titled 'The Economic Effects of Malaria Eradication: Evidence from an Intervention in Uganda', infection during pregnancy can cause anaemia and reduce 'in utero' nutrition, leading to reduced neuro cognitive function and decreasing a child's likelihood of attending or advancing through school.

Furthermore Infection during childhood causes cognitive impairment and can reduce educational outcomes which in the long run can lead to lower productive capacity of the economy. Presence of malaria in households can reduce household's income which results into lower savings, lower investment, and reduced human capital development inform of both education and health, low output and productivity.

National wide malaria prevention and treatment costs exert excessive burden to merger national resources. This results into less expenditure on other important areas of social services such as education. For instance, the cost of malaria to Africa is estimated at \$12.5 billion per year, which represents 1.3 percent of affected countries economic growth (GDP). In some countries, malaria accounts for up to 40 percent of total health expenditure and 20-50 percent of hospital admissions. Productivity is reduced and staff turnover increased by illness-related absenteeism and children's education is severely disrupted. Rural and poor populations carry the overwhelming burden of malaria because access to effective treatment is extremely limited. In rural areas, infection rates are highest during the rainy

season - a time of intense agricultural activity. Research indicates families affected by malaria harvest 60 percent less crops than other families.

The impact of malaria on children remains a serious obstacle to the achievement of many of the Millennium Development Goals (MDGs), including Goal 2 (universal primary education) and Goal 4 (the reduction of infant mortality).

According to World Bank, for the education sector in Africa, malaria is of substantial importance with regards to Early child Development Programmes. In schoolchildren, malaria represents 3 to 8 percent of all cause absenteeism, and up to 50 percent of readily preventable absenteeism. Mortality is low in schoolchildren, but 15 to 20 percent is due to malaria. Prevention of early malaria may be important to the educational achievement of children at school age.

What can schools do about malaria? Children can be important agents for change. Health education through schools can help promote a community wide understanding of malaria and the need for control and can create a demand for health services (both private and public) to provide universal access to affordable and appropriate treatment. The management of treatment by and in schools appears an unaffordable and unattractive option. However, the promotion by schools of prompt and effective presumptive treatment provides an affordable option. Skills based health education can give children the ability to recognise the signs and symptoms of malaria, to recognise the need to seek treatment, and to differentiate symptomatic from curative treatment.

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