

Malaria – A disease of the poor. A cause and a consequence of poverty in Sub-Saharan Africa.

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Malaria is a life threatening parasitic illness that despite being entirely preventable and treatable is one of the world's largest public health challenges. Sub Saharan Africa bears a heavy burden of morbidity and mortality from this disease which is disproportional to the rest of the world. Malaria is often referred to a disease of the poor. It will be argued that it is not simply malaria that causes poverty, nor is it simply poverty that causes malaria, but rather it is a close association of the two. This close association is a vicious cycle and one that is complex.

As defined by the World Health Organisation (2013) Malaria is a life-threatening disease caused by *Plasmodium* parasites that are transmitted to people through the bites of infected *Anopheles* mosquitoes, which bite mainly between dusk and dawn (WHO 2013).

There are five main parasite species that cause malaria in humans:

- *Plasmodium falciparum*
- *Plasmodium vivax*
- *Plasmodium malariae*
- *Plasmodium ovale*
- *Plasmodium Knowlesi*

Plasmodium falciparum and *Plasmodium vivax* are the most common with *Plasmodium falciparum* being the most deadly and one of the most common in Sub Saharan Africa (WHO, World Malaria Report, 2012).

The life cycle of the parasite is complex and involves successfully infecting two types of hosts: humans and the female *Anopheles* mosquito, with the mosquito acting as the vector which does not suffer from the presence of malaria.

The malaria parasite life cycle is illustrated in the Centre for Disease Control diagram below.

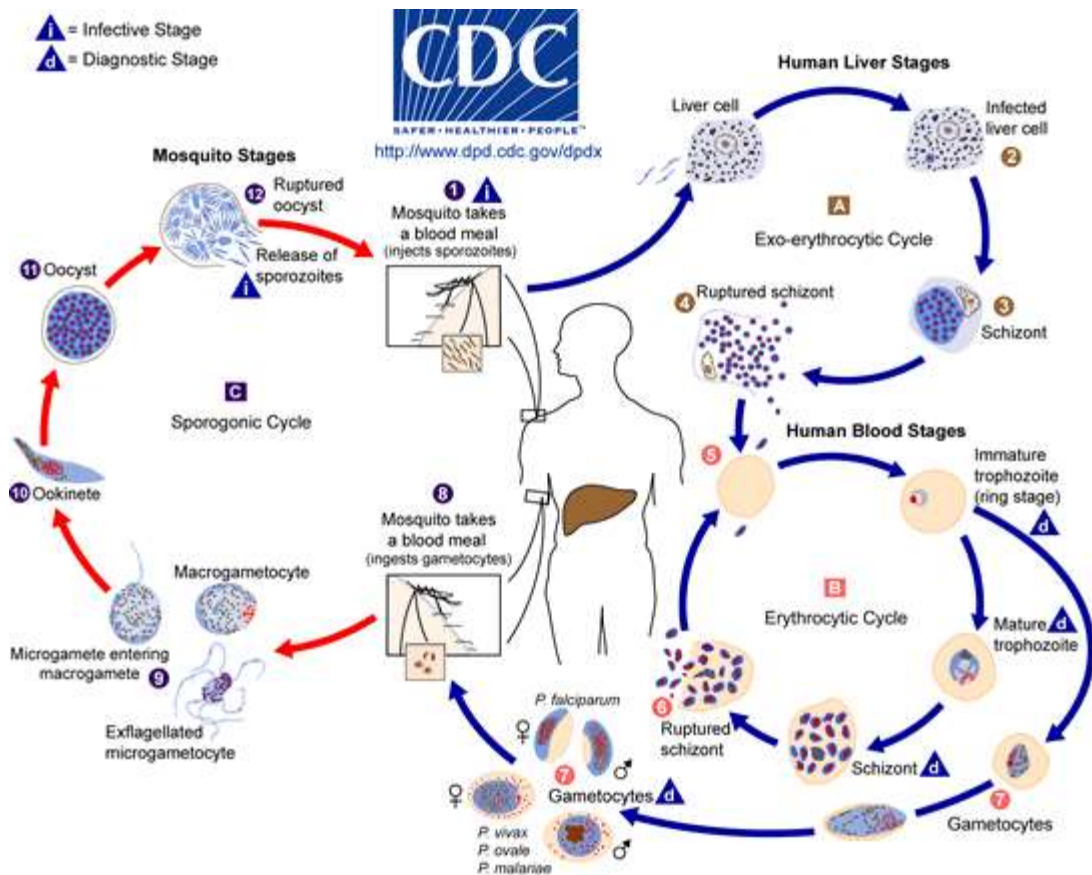


Figure 1. Centre for Disease Control, Malaria, Biology, 2012.

The fact that malaria has two hosts makes it difficult to control or eradicate and as we can see from the above diagram the control of malaria would involve three living things, the parasite, mosquito and man.

The WHO (2013) describe Malaria as an acute febrile illness with symptoms that appear seven days or more (usually 10–15 days) after the infective mosquito bite, these symptoms include fever, headache, chills and vomiting. If not treated within 24 hours, *P. falciparum* malaria can progress resulting in severe illness and often leading to death (WHO 2013).

The initial illness which can be severe and debilitating within itself can also lead to ongoing disability. Figure 2 below shows the many clinical manifestations of malaria and their sequelae as summarised by Breman, Alilio and Mills, 2004.

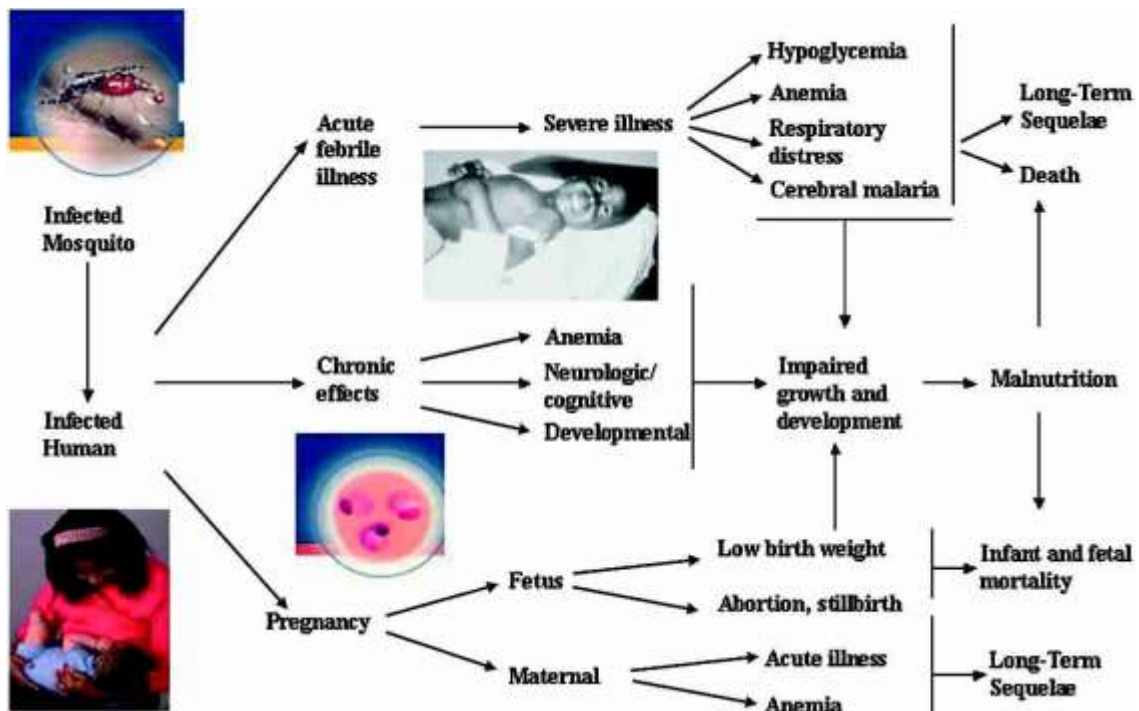


FIGURE 2. Acute, chronic, and pregnancy-related manifestations of malaria (Breman, Alilio and Mills 2004, p.4)

According to the WHO World Malaria Report 2012, 3.3 billion people worldwide were at risk of malaria with populations living in sub Saharan Africa having the highest risk of acquiring malaria. In what is an alarming figure the WHO alert us to the fact that approximately 80% of cases and 90% of deaths are estimated to occur in the WHO African Region.

The prevalence of this illness is tremendous and it is estimated that there are 300-500 million clinical cases of malaria per year with this murderous disease resulting in 1 million deaths per year, mostly in children under five years of age in sub Saharan Africa (UNICEF 2004).

In addition to costing lives, this epidemic also creates huge economic loss. With the vast majority of malaria deaths occurring in sub Saharan Africa it is estimated to cost this continent more than US\$ 12 billion every year in lost gross domestic product (GDP), accounts for 40% of public health expenditure and presents major obstacles to social and economic development (Roll Back Malaria 2002). Hence, as stated by Gallup and Sachs “malaria and poverty are intimately connected” (Gallup and Sachs 2001, p. 85).

Poverty has numerous definitions which are varied, a detailed definition of poverty as defined by a 1998 United Nations statement signed by the heads of all UN agencies states that poverty is “a denial of choices and opportunities, a violation of human dignity. It means lack of basic capacity to participate effectively in society. It means not having enough to feed and clothe a family, not having a school or clinic to go to, not having the land on which to grow one’s food or a job to earn one’s living, not having access to credit. It means insecurity, powerlessness and exclusion of individuals, households and communities. It means susceptibility to violence, and it often implies living in marginal or fragile environments, without access to clean water or sanitation” (Gordon 2005).

As illustrated by Gallup and Sachs (2001, p.86) The global distribution of per-capita gross domestic product shows a striking correlation between malaria and poverty.

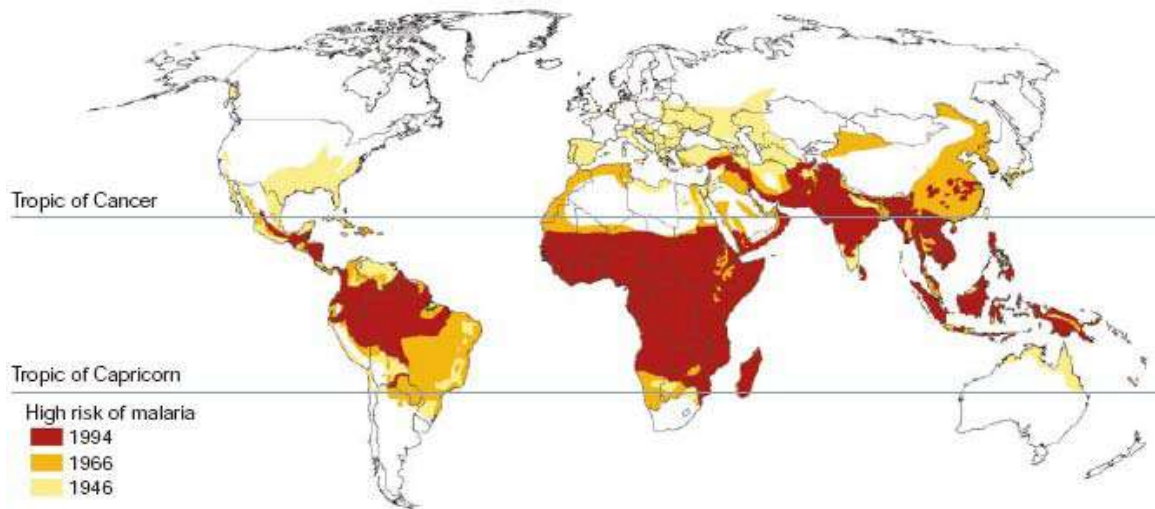


figure 3: Global distribution of malaria in 1946, 1966 and 1994 (Gallup and Sachs, 2001, p.86).

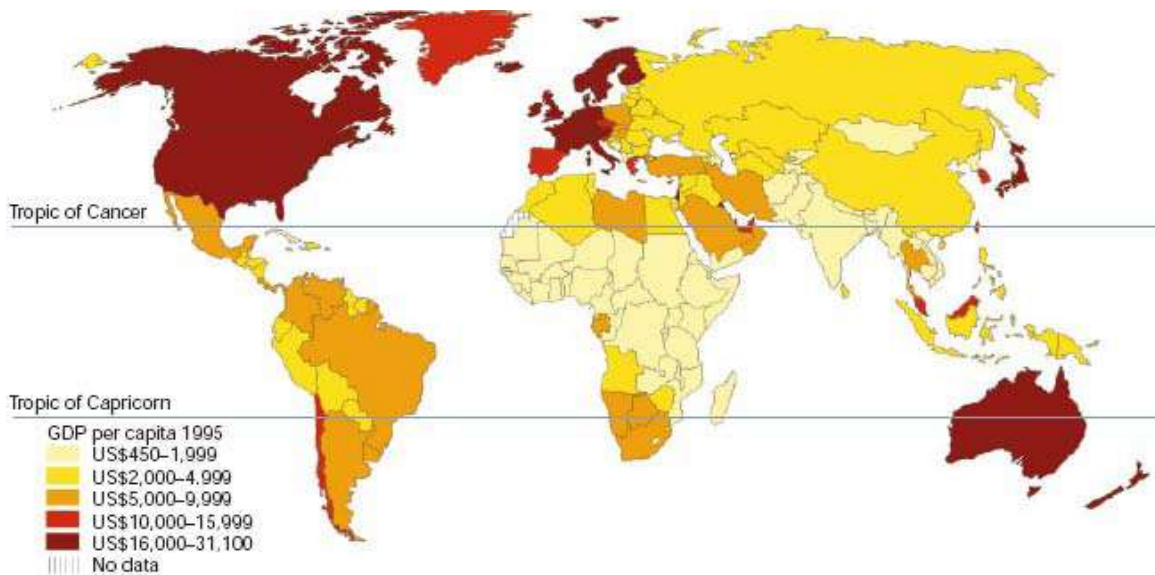


Figure 4: Global distribution of GDP per capita. Tropical regions have the lowest average (Gallup and Sachs, 2001, p.86).

Malaria has significant measurable direct and indirect costs and is often discussed in relation to poverty. It has been shown to be a major constraint to economic development on both an individual and national level (Roll Back Malaria 2001 – 2010). In relation to poverty it has been shown that where malaria prospers most it is often these human societies that have prospered least (Sachs and Malaney 2002).

Poverty is often discussed as a cause of malaria, although it is not a direct cause of malaria the many consequences of poverty increase the risk, morbidity and mortality of malaria, these consequences of poverty and their impact will be discussed below in no order of relevance.

Exposure to infection can be a cause of malaria, this may occur due to poor housing which puts people at a higher risk of being bitten by a mosquito that may be carrying the malaria parasite. People of poverty often live in poorly constructed dwellings prone to mosquito proliferation and as discussed by Yazoumé et al. (2006) living in a completed house with brick and plaster walls and tiled roofs is highly associated with malaria risk reduction compared to living in the poorest type of house, therefore those living in better housing have a reduced malaria infection risk.

Inability to afford preventative measures such as insecticide-treated bed nets is another consequence of poverty. There is overwhelming evidence that insecticide treated nets (ITNs) have enormous potential for alleviating the burden of malaria in Africa (Lengeler 2004). However, if the poorest households have limited access to and use of these nets, their burden of malaria may be disproportionately higher and as highlighted by Guyatt, Ochola and Snow (2002) studies have shown that people of poverty may be too poor to pay for vector control tools thereby leading to greater exposure to the disease.

Economic disadvantage, a feature of poverty, often means that the poorest households are less likely to be able access health care services and this inequitable access can lead to increased exposure to malaria for these poorest households

(Carne et al. 1994). Restriction of access to health care can occur due to a large array of factors; these may be financial, geographical, physical, social and cultural barriers (Teklehaimanot and Mejia 2008). According to the WHO, an estimated 30 per cent of the worlds population lacks regular access to existing drugs, with this figure rising to over 50 per cent in the poorest parts of Africa and within these populations, it is the poorest socioeconomic groups that disproportionately suffer from a lack of access to existing medicines (WHO, Medicines Strategy Report 2002–2003).

Even if people of poverty are able to access health care, the cost of treatment is often a barrier and can be catastrophic to the individual, family or community. Chuma, Okungu and Molyneux (2010) identified affordability as a major barrier to accessing treatment and stated that ‘high costs of treatment reportedly prevented people from seeking effective treatment despite knowing that malaria should be treated with appropriate anti-malarials’ (Chuma, Okungu and Molyneux 2010, pg. 5).

Gender issues which are often prevalent in poor communities often mean that women are disadvantaged when it comes to prevention and treatment of malaria and women often experience particular problems in raising funds for treatment often opting for cheaper often more ineffective drugs (Chuma et al. 2010).

This leads directly into another consequence of poverty in that often people of poverty often receive drugs of poor quality. Chuma et al. (2010) explain that insufficiency of cash was common among individuals self-treating using drugs from the shops. In most of Africa, especially among poorer households, diagnosis and treatment of malaria is largely done at home. Drugs of poor quality are often bought from locals shops with up to 72 percent of people seeking treatment from informal and unregulated outlets (Amexo et al. 2004). This is an unfortunate result for people of poverty, who despite their situation are attempting to take to correct measures to prevent and treat malaria. The purchase of drugs from poor sources is often due to a lack of knowledge.

Lack of education and knowledge, often a common consequence of poverty plays an important role in malaria morbidity and mortality. Education level seems to affect people's decision to seek treatment. In a study in Tanzania and Malawi those with higher education visited health facilities faster than those with lower education levels (McCombie 2002). Education levels appear to influence decision making and as Marsland (2006) discusses differences in education and income levels might affect prevention, control methods and choice of drugs for treatment and he illustrates that over recent years there has been emphasis on the idea that improving knowledge about malaria in communities will lead to better use of interventions. Baragatti et. al. (2009) also proved that the education levels of children were significantly associated with the prevalence of malaria infection.

Poverty is often a reason for migration, the search for work, opportunity and a better life means that people often migrate from rural to urban areas which results in rapid unplanned urban growth and high density population, or into jungles and forests where malaria vectors are abundant and as Teklehaimanot and Mejia (2008) explain both of these scenarios result in optimal conditions for malaria transmission, therefore increasing the risk of morbidity and mortality from malaria.

Poor nutrition, a condition often associated with poverty has been found to increase the risk of malaria and as research performed by Perez-Escamilla et al. (2009) proved under-nutrition is associated with increased risk for malaria. The Ghana Health Service (2013) also documents a recent study which reported that underweight children are significantly more likely to have clinical malaria. 'Malaria is more frequent and severe among children with protein-energy undernutrition, leading to higher morbidity and mortality due to impaired host immunity' (Ghana Health Service, 2013).

High levels of corruption in African countries can often explain limited progress in poverty reduction. Corruption at the highest level in some countries means that the poor remain poor and it is often the most vulnerable that pay the biggest price,

therefore corruption exacerbates poverty which can be a cause of malaria (Ndikumana 2006).

Culture and beliefs can also play a role in how people prevent, treat and perceive malaria. People from a background of poverty may have been brought up with particular traditions which may increase their risk of malaria infection. An example of this may be a family that partakes in outdoor activities at dusk and dawn increasing their risk of malaria transmission (Dunn et al. 2011). Often culture and beliefs influence decision making and the use of preventative measures and treatment of malaria, therefore increasing the risk of morbidity and mortality from malaria.

As we can see, there are many examples of how poverty can cause malaria which include; exposure to infection, affordability, accessibility, gender issues, lack of knowledge and education, migration, poor nutrition, corruption and culture. The relationship of malaria and poverty is complex and whilst poverty as a cause of malaria has been shown it is important to also discuss malaria as a cause of poverty.

As previously discussed affordability of treatment of malaria is often catastrophic to people of poverty and is a major barrier to accessing treatment therefore increasing the risk of malaria morbidity and mortality, however for those that do access treatment it can have devastating financial impact and is often a further disadvantage to the poor, therefore causing poverty (WHO 2006). The choice/necessity of accessing and receiving treatment can dramatically change the financial situation of an individual, family or community and can plunge these vulnerable people into dire situations.

The substantial cost of malaria is not only individual but also national. The Centre for Disease Control explains that malaria imposes substantial costs to both individuals and governments with the costs to individuals and their families including purchase of drugs; expenses for travel to, and treatment at, dispensaries

and clinics; lost days of work; absence from school; expenses for preventive measures and even expenses for burial in case of deaths whilst the costs to governments include maintenance of health facilities; purchase of drugs and supplies; public health interventions; lost days of work with resulting loss of income and lost opportunities for joint economic ventures and tourism (Centre for Disease Control – Impact of Malaria).

As previously mentioned it is estimated that malaria costs sub Saharan Africa more than US\$ 12 billion every year and on an individual level a very-low-income African family whose yearly income is \$68 may spend \$19 for malaria treatment each year, this highlights that often the economic burden is higher among the poorest in a population (John Hopkins University, 2013).

The presence of malaria in a country can also hamper individual and national prosperity due to its influence on social and economic decisions. Investors from non-malarious regions fear the risk of contracting malaria and this can deter investment and therefore have a negative impact on economic productivity, growth and prevents these poor countries from developing, often contributing to keeping these countries in a poor economic state (The Earth Institute Columbia University).

Another economic impact which can lead to poverty is that of days lost in education. Poor education and absenteeism can lead to poverty and there is a high correlation between education status and income status (Zhang, 2003). Illness from malaria due to its symptoms can cause absenteeism from school and Brooker et al. (2000) explain that loss of education due to illness from malaria accounts for 8 percent of school absenteeism in an African Country.

Disability as a result of infection with malaria can occur with both physical and neurological impact, this disability limits access to education and employment, and leads to economic and social exclusion, therefore often resulting in poverty (Department for International Development, 2000).

Loss of ability to work as a result of the symptoms of Malaria can also lead to poverty. Symptoms from infection with malaria include fever, chills, headaches, diaphoresis, dizziness, malaise, myalgia, abdominal pain, nausea, vomiting, mild diarrhea, tachycardia, jaundice, pallor, orthostatic hypotension, hepatomegaly, and splenomegaly (Trampus et al. 2003). A single bout of malaria is estimated to cost a sum equivalent to 10-20 working days in Africa and often tends to occur at harvest time therefore, this loss of ability to work can contribute to loss of income and ultimately poverty (John Hopkins University, 2013).

People at risk of malaria often prefer low yielding, subsistence crops rather than more labour-intensive cash crops because of malaria's impact on labour during harvest season, this therefore reduces the socioeconomic status of these people which may lead to poverty (Roll Back Malaria – Economic Costs of Malaria).

Malaria causing poverty as discussed above includes many causes such as cost, overseas investment, absenteeism, disability, inability to work and choice of crops. The connection between malaria and poverty could be described as a vicious cycle. It would take enormous effort to reduce both the burden of malaria and the prevalence of poverty in Sub Saharan Africa. A complex strategy that is aimed at both malaria and poverty reduction together would be required to alleviate poverty and reduce the burden of malaria.

As we can see from the discussion above, the malaria parasite inflicts a huge burden with epidemic levels of morbidity and mortality on the people of sub Saharan Africa. It has been proved that the relationship between malaria and poverty is complex with ongoing detrimental effects to individuals, families, communities and whole countries. This relationship between malaria and poverty could be labeled as a vicious cycle. A complex strategy aimed at both reducing malaria infections and alleviating poverty would be required to improve the lives and reduce the morbidity and mortality from malaria for many people living in sub Saharan Africa.

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