



Socio-economic Impact of Malaria in Africa

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Favored by Plasmodium, malaria is a disease representing a major public health challenge in the four corners of the globe and particularly on the African continent where 2,70,000 people live without protecting themselves from it. As a result, the World Health Organization (WHO) counts nearly one million victims every year. While the fight against this scourge has increased in recent years around the war against mosquitoes, insects on their side have become more resistant than in the past and no longer systematically succumb to all insecticides.

Reports from different periods of our long history indicate that malaria has been present in most major human civilizations, even the oldest. Nevertheless, if many hypotheses evoke the presence of this disease already in the prehistoric man, it is difficult to affirm it. The onset of the disease could be traced back to the origin of man in Africa, before he followed his migration to Europe and Asia by coevolution [1]. The origin of the disease is poorly documented, but archaeological excavations suggest that the expansion of malaria would coincide with the emergence of agriculture. Retrospective genetic studies demonstrate that malaria has significantly affected humans since the era of agricultural development in Africa and the Near East [2].

Africa is struggling to defeat malaria for several reasons. Most infections in sub-Saharan Africa are caused by *Plasmodium falciparum*, which is the most serious and dangerous form of the disease. It is also in this region that we find the most aggressive species of mosquitoes; transmission rates are therefore much higher than elsewhere. On the other hand, political and social unrest disrupts malaria control campaigns and often forces large numbers of people to settle in high-risk areas. In addition, the malaria parasite has become resistant to the most common drugs, particularly chloroquine which is the cheapest and most commonly used antimalarial drug in Africa. Since 2001, WHO has recommended that countries where malaria is resistant to conventional treatments replace these treatments with artemisinin-based combination therapy, and 40 countries including 20 African countries have officially adopted it.

Artemisinin's are the most effective medicine against malaria, but at USD 2 a dose for adults, they cost 10 to 20 times more expensive than older drugs. However, public support for health clearly provides a complementary response to private health expenditure which still constitutes a large proportion of spending in Africa. Public support also covers collective needs that private expenditure cannot meet alone.

Long-term positive effects are also too often overlooked. The fight against malaria can have significant economic effects in Africa. A study of the economic effects of malaria assistance showed that the campaign reduces child mortality and fertility. The campaign also increases the supply of adult labor and educational attainment. The effect of malaria on education is less known through its effects on school absenteeism, academic performance, and repetition or completion rates. More broadly, malaria affects children's cognition which will be the lifeblood of tomorrow's development. All of these mechanisms affect economic development and maintain poverty traps. Of course, this seemingly sudden resurgence of malaria is not only linked to the decline in aid. The resistance phenomena, from mosquito vectors of the disease to insecticides and from the parasite to combination treatments, also contribute to this risk resurging. Research outside the field of economics is there to help us find new ways of struggle and better understand these mechanisms.

Beyond the social and public health problem it poses, malaria is also an economic problem. In other words, the link between illness and the business world is both real and strong. The most glaring evidence is that in countries where it is well established, malaria is one of the leading causes of work absenteeism. As a result, taking action and initiatives against malaria is part of the fight for the sustainability and profitability of companies because this scourge killed 627,000 people in 2012 and malaria causes an annual loss of USD 12 billion according to the World Bank. A sick employee suffers between two and three malaria episodes a year, not to mention those of his family for which he takes time off. So, heavily affected, companies are also best placed to fight the disease. In Africa, where the main challenge for the public sector is to reach remote villages, the authorities can rely on them. It's the companies that have the know-how in logistics, purchasing and procurement, and the human resources they need. In Benin, for example, thirty companies are involved in the fight against malaria. It allowed possible to raise the awareness of 150,000 workers over the last three years and to make 60% of people sleep under impregnated mosquito nets, resulting in absenteeism having dropped by more than 50%, a result that has an undeniable economic impact. Malaria also places a high direct and indirect cost on individuals according to studies conducted in some African countries [3]. With respect to public expenditures, according to the results of the study conducted by Shepard, *et al.* [4], about 19% of the budget of the Rwandan Ministry of Health, for example, was allocated to expenditures related to malaria treatment and public facilities. For the families,

the suffering caused by the disease is almost always accompanied by economic burdens which are purchase of impregnated mosquito nets, medical fees, antimalarial drugs, transport costs to the care centers, expenses related to the care provided to the patients and expenses of funerals. These expenses can be unbearably heavy on households.

In Ghana, for example, malaria treatment strikes up to 34% of the incomes of poor households. Malaria thus contributes to no doubt the process of exhaustion of household capital and loss of income while reducing the consumption of these households. It retards economic development and perpetuates the vicious circle of poverty [4,5]. As has been shown in various studies, we assume that malaria (the number of malaria cases) has a significant impact on per capita health expenditures and leads to reduced well-being and poverty [6-9]. We also believe that the low level of health expenditure increases the level of malaria, as it is considered a disease of poverty, making poor people its main targets. We examined a sample of 39 countries from the sub-Saharan Africa also called Black Africa. This region is generally subdivided into four subregions known as: West Africa, East Africa, Central Africa, and Southern Africa. Made up of 48 countries (including islands) and populated by about 1128 million inhabitants (beginning of the 21st century), sub-Saharan Africa is the poorest part of the continent, particularly in the economic field and the most affected by several diseases of the world.

If we can think that any disease causes economic losses, both direct (because of expenses related to treatment or prevention) and indirect (due to absenteeism, a decrease in productivity), this cost is not systematically highlighted for two main reasons. The first is the difficulty of finding an indicator capable of correctly measuring the impact of this condition on mortality, morbidity and disability [10]. Indeed, on the one hand, one can be parasitized, even intensely, without being sick and, on the other hand, one can have fever without it being malaria. In the absence of unbiased measures of disease and its severity, it becomes difficult to observe an economic impact. The second reason is related to the economic behavior of households in response to episodes of illness that leads them to offset the decline in productivity or the absence of a sick asset by increasing productivity of non-sick assets [11].

The big problem is the lack and/or inadequacy of sanitation infrastructure in people's living environments and behaviors which are sometimes without hygiene rules. Even in large urban centers where the level of understanding seems high, it is common to find in the middle of dwellings, ponds where stagnant dirty waters which serve as nests to the anopheles. Finally, there are the interests of the big international firms and Western countries that are beneficiaries of the drug markets and are hijacking the rapid search for a preventive vaccine. This means that the path to complete eradication of malaria is long and involves many pitfalls. That said, hope is allowed because some African countries may soon achieve malaria eradication by 2030 and could inspire others by example. These are Algeria, Cape Verde, Swaziland, Botswana, Comoros and South Africa. We also note with satisfaction that research in different countries shows that we are moving towards the discovery of a vaccine.

This is the case, for example, in Burkina Faso where the preventive vaccine of the Malaria Research Center has gone beyond the experimental framework and is looking for a license that should allow its extension. In addition to the vaccine, innovative leads such as the release of mosquitoes genetically modified able to neutralize anopheles have shown their effectiveness.

While waiting for all these initiatives, it is up to everyone to sweep in front of his door by developing the basic reflexes of sleeping under an impregnated mosquito net and to remove the stagnant places of dirty water. At the level of the rulers, a measure that could relieve the malarious and their families would be the downward revision of the treatments against malaria which are still not within reach of the stock of many Africans.

Bridging the gaps Africa has everything to gain by investing in the fight against malaria. Malaria is already costing the continent's economy USD 12 billion a year in direct losses. The resources needed for malaria elimination are insignificant compared to those required to overcome the disease in case of resurgence, especially given the current resistance to drugs and insecticides. The benefits of investing in the fight against malaria are not only financial: this struggle contributes significantly to agriculture, education, women's empowerment, the eradication of poverty and achievement of other Sustainable Development Goals. Countries are increasingly investing their own funds using a wide range of innovative resources and the local private sector and improving their public financial management systems that will really succeed in attracting more and more external financing to fight against malaria until its elimination [12].

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