

## The Complexities of Malaria in Ghana

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*Malaria is a disease produced by a mosquito infected parasite which is then spread to humans through bites. Ghana is one of 15 countries in the world where malaria has a high impact. In Ghana, malaria greatly effects children under the age of 5 and pregnant women due to the fact that both populations are immunocompromised. To reduce the number of individuals affected by malaria in the country, Artemisinin-based Combination Therapy (ACT) has been recommended as the most efficient treatment modality; however, the treatment comes at a cost and is not readily available to those residing in the rural areas of Ghana. The spread of malaria is highly prevalent in Ghana because of a number of underlying issues that contribute to the burden of the disease. When it comes to examining the crisis of malaria, it is important to examine how the social determinants of health such as gender, globalization, inequities, and politics further influence the pervasiveness of malaria in Ghana.*

**Keywords:** Ghana, burden of disease, history of malaria, biomedical burden of malaria, social burden of malaria, economic burden of malaria, political burden of malaria, globalization of malaria, treatment of malaria

### INTRODUCTION

Approximately 22,000 people die each year of malaria in Ghana and of those, 20% are deaths of pregnant women and children under the age of 5 years (World Health Organization [WHO], 2015). In 2014, in Ghana, the number of confirmed cases of malaria was 3,415,912 (WHO, 2015).

Malaria largely impacts rural areas and individuals with poor socioeconomic status, especially pregnant women and children (Centers for Disease Control and Prevention [CDC], 2016a). Furthermore, malaria is difficult to treat, making it a large financial burden for governments and citizens alike (CDC, 2016a). Artemisinin-based Combination Therapy (ACT) is the number one recommended treatment for malaria as it is very effective, fast acting and reduces the likelihood of the microorganism (*Plasmodium* parasite) forming a resistance to the effects of the drug itself (Banek et al., 2014). When addressing the socioeconomic impact of malaria, it is critical to



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examine the issues of cost, access, and delivery of ACT as a combatant against the disease. In order to fight malaria, there must be an increase in case detection and treatment success rates. It is also important to pay special attention to the diagnosis and management of malaria. This paper will discuss how poor economic and social conditions, considering factors such as gender, politics, globalization, and inequity, influence the crisis of malaria in Ghana.

### **MAJOR BURDENS OF DISEASE IN GHANA**

#### **Global Health Issue**

As recently as 2016, in Ghana, 44.1% of deaths and disability were attributable to non-communicable diseases and 48.8% of deaths and disability were due to infectious diseases (Institute for Health Metrics and Evaluation [IHME], 2017). The top five major causes of death in Ghana are: malaria, lower respiratory infections, ischemic heart disease, HIV/AIDS, and cerebrovascular disease (WHO, 2015). Although the rates of non-communicable diseases are increasing, infectious diseases are still more prevalent in Ghana due to the lack of prevention and treatment. Malaria is of global importance because it is a vector-borne, parasitic disease carried by mosquitos. As mosquitos are a migratory insect, this makes malaria both widespread and difficult to trace and control thus creating a greater burden on the global healthcare system (IHME, 2017).

Malaria has a high death and illness rate and is more prevalent in vulnerable populations. The increase in prevalence among pregnant women is because a woman's immunity is momentarily suppressed during pregnancy. Young children are also vulnerable because their immune systems are not fully matured. Due to their compromised immunity, pregnant women and young children have a high mortality rate and have the greatest risk of developing severe clinical symptoms of malaria infection (Ricci, 2012). Although adults may also become infected with malaria, it is often less severe due to their developed immune systems (Ricci, 2012).

#### **HISTORY OF MALARIA**

Malaria is one of the longest enduring diseases, originally from Africa because of the continent's warm and tropical climate (CDC, 2016b). In 1955, the WHO began its efforts to eliminate malaria worldwide starting with countries with seasonal malaria transmission and temperate climates. The WHO's eradication efforts focused on surveillance, antimalarial drug treatment, and house spraying with residual insecticides. Although successful in these countries, Ghana was not included in the eradication campaign; furthermore, the campaign was eventually abandoned due to a lack of government funding (CDC, 2016b). To date, a malaria vaccine is still not in the works, nor are adequate vector control strategies or appropriate therapies to treat the disease that would eliminate death caused by the illness and aid in the abolition of malaria. In order to gain control of malaria, the goal must be to target the spread

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of malaria to a point where it is no longer a public and global health problem (CDC, 2016b).

### **COMPLEX FACTORS CONTRIBUTING TO MALARIA**

#### **Biomedical Burden of Malaria**

Malaria occurs after one is bitten by a mosquito carrying the *Plasmodium* parasite. Once bitten, the parasite enters the bloodstream and travels to the liver where it matures and then infects red blood cells (Crompton et al., 2014). According to Crompton et al. (2014), contracting malaria during pregnancy can lead to extensive fetal, infant, and maternal illness as the infected mother can pass the disease on to the neonate at birth. The death of children with malaria is often due to cerebral malaria which causes seizures or comas; low birth weight from infected pregnant mothers; and respiratory distress from severe metabolic anemia and acidosis. Lastly, repeated malarial disease in children can contribute to long-term consequences such as respiratory infections and diarrhea (Crompton et al., 2014).

#### **Social Burden of Malaria**

According to the WHO (n.d.), the social determinants of health (SDH) are defined as factors not related to medicine that influence the outcome of one's health. They are settings in which people are born, develop, live, work, and age with outside structures and forces that shape the surroundings of daily life. These structures and forces comprise of social norms, social policies, development agendas, economic policies and systems, and political systems (WHO, n.d.). It is important to consider how the varying SDH such as education, gender, housing, and income influence health inequities and how they impact the spread and control of malaria in Ghana.

Public health and the government of Ghana are making strides to improve malaria control interventions and education; however, individuals living in marginalized areas are often poor and lack awareness and health information due to lower levels of education and literacy. Individuals who are illiterate may not understand written information about malaria on flyers or posters put out by public health. The poor also lack access to such information where messages from public health are broadcasted over media, as most low-income households do not have televisions or radios (Ricci, 2012). Public health interventions fail to accommodate the poor especially considering that malarial transmission rates are greater for those living in marginalized areas. Public health measures such as using insecticide-treated bed nets and providing access to clinics to treat symptoms are not readily available to Ghana's rural communities. As a result, those living in marginalized areas struggle to attain access to adequate prevention measures (Ricci, 2012).

Low-income households cannot afford the interventions that would protect them from malaria because anti-malarial drugs are an out-of-pocket expense, as are insecticide spray and bed nets (Ricci, 2012). Structural dwellings may also increase

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the risk of contracting malaria because houses that are often inadequately constructed allow mosquitos to enter freely, compared to adequately built houses that have windows with screens. Overcrowding of households may also lead to an increased rate of contracting malaria because higher concentrations of carbon dioxide in crowded houses attract mosquitos (Ricci, 2012). People who are poor are often the ones living in such inadequate dwellings and thus are at higher risk of catching malaria.

Additionally, individuals residing in low-income households are often famished. Children who are underweight and malnourished are often deficient in protein and specific vitamins and minerals such as vitamin A, iodine, iron, and zinc. Having these deficiencies can lead to an underdeveloped immune system which in turn puts these children at a greater risk of contracting malaria (Ricci, 2012). Lastly, social exclusion based on gender also contributes to the disproportionate impact of malaria on women as women are more often illiterate compared to men and are frequently tasked with being mothers and homemakers with limited access to public health resources and access to education (Ricci, 2012).

### **Economic/Political Burden of Malaria**

There is a significant financial burden of malaria in Ghana on the government and its citizens. According to the CDC (2016a), malaria causes families and individuals not only to miss work and school, but also to carry the high cost of out-of-pocket expenses for anti-malarial drugs and pesticides. In addition, sick individuals must also bear the expenses of travel to and from clinics, and burial in the case of death. When it comes to seeking care, associated costs are often either direct, such as charges for services, unintended, such as cost of travel, and economic, such as loss of income due to being off work from the illness. All of these factors work against efforts to mitigate preventable diseases such as malaria.

Governmental costs include staffing, supply, and maintenance of health facilities; public health interventions against malaria such as the distribution of insecticide-treated bed nets or insecticide spray, anti-malarial drugs, and supplies; lost chances for economic tourism; and lost days of work causing losses of income. The total annual cost of malaria prevention and treatment in Ghana, including health system treatment costs and household costs, is \$37.8 million US (Nonvignon et al., 2016). Not only does malaria have a financial burden on the government, but corporate businesses are also affected. Malaria affects employee attendance, productivity, expenses, and reduces the efficiency of businesses. According to Nonvignon et al. (2016), in Ghana, businesses lost \$6.58 million USD as a direct result of malaria costs. Although the government should be responsible for allocating resources to malaria control and prevention, in recent years the private sector has become more involved with the undertaking.

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Ghana's private and public sectors play a large role in malaria prevention. For example, Ghana's private sector is very large and vastly growing; and its engagement in malaria prevention and control over the past decade has increased. The private sector has become involved through marketing of malaria prevention products; effective malaria treatment; and other public-private partnerships and services incorporating market catalyzation for malaria control products. The public sector has become more involved through campaigns, education, and further research and development with regards to malaria control. They have invested in providing informative materials to their staff, families, and direct communities (Shretta et al., 2020).

On average, Ghana receives \$36 million USD of funding from the Global Fund, which the country is highly dependent on (Ghana Health Service [GHS], 2017). The government of Ghana, however, has recently been diverting its global funds and resources from supporting the control of malaria to sustaining the economy (GHS, 2017). In order for the government to reallocate the funds back toward malaria control, aimed interventions such as vector control to marginalized populations and high-risk areas will likely aid in extensive cost-efficiencies. By implementing structures to improve productivity through the control of malaria this can serve as a sponsorship tool to entice new and existing investors. These strategies can be made more effective by ambassadors or key influencers to ensure accountability (Shretta et al., 2020).

Lastly, the government of Ghana currently accumulates taxes on alcohol and soda, lottery funds, petroleum revenues, tobacco products, and tourism and airport levies. According to Shretta et al., (2020) these taxes collected are not allocated for health and thus create a prospective opening for increased funding for malaria control. According to the law put forth by the government of Ghana, 0.5% of new obtained funding allotted to the District Assembly Common Fund is delegated to district-level elimination efforts and control of malaria. However, it has been noted that these funds are not being utilized for the purpose of malaria control and this needs to be re-examined by the government (Shretta et al., 2020).

### **GLOBALIZATION AND MALARIA**

The process of globalization has been linked to an increase in malaria worldwide due to human migration and deforestation. Globally, it has been reported that there were 212 million clinical cases of malaria in 2015, with 429,000 of those cases resulting in death, and most of them being children in Africa (CDC, 2016a). The principal malaria mosquito, *Anopheles gambiae*, is very common in Ghana and is very efficient at transmitting malaria (WHO, 2014). Deforestation creates conditions that are conducive to mosquito reproduction. By having new paths of open land as a result of clear cutting, rainwater and sunlight accumulate and create new habitats for mosquitos to populate. Deforestation creates highways that allow *Anopheles*

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mosquitos to migrate to unaffected regions, such as the cities of South Africa and other parts of Africa where they would otherwise have not been able to reach (WHO, 2014). The environmental impact of deforestation further contributes to the spread of malaria and is another factor that if further examined and deterred may aid in reducing the spread of the disease.

### **RECOMMENDATION**

In 2003, the government of Ghana launched the Roll Back Malaria (RBM) initiative, which aims to decrease illness and death caused by the disease through enacting strategic projects in malaria control, developing the health sector overall, and increasing coverage of universal access to prevention and treatment, with a goal to reducing malaria-related mortality by 75% by the year 2020 (United Nations Children's Fund [Unicef], 2017).

Strategies to combat malaria include indoor residual spray, insecticide-treated mosquito nets, intermittent preventative treatment of women who are pregnant and children under the age of 5 years, and accurate diagnosis and prompt treatment with ACT (Unicef, 2017). In order to evaluate the effectiveness of ACT, a study was done in Ghana with 1,740 children who presented with a fever over a period of 12 months and were positive for the malaria parasite. Artemisinin-based Combination Therapy was the chosen therapy and there was a 71% to 87% treatment success rate (Banek et al., 2014). Drawbacks of using ACT treatment include high cost, limited public awareness of how it works, inadequate knowledge regarding its safety in pregnancy, an imbalance between supply and demand, and inadequate surveillance systems specific to malaria (Banek et al., 2014). In an effort to tackle this issue, the government of Ghana has set up the National Health Insurance Scheme allocating its resources to treating malaria and introducing a policy where children under the age of 5 years with malaria will receive ACT at a lower cost (Banek et al., 2014). Although ACT is the number one recommended treatment for malaria, as well as the easiest solution, other factors, such as mitigating the SDH, need to be taken into consideration when it comes to preventative measures.

### **CONCLUSION**

In order to combat the issue of malaria in Ghana, it is important to examine the relationship between poor economic and social conditions, as affected by gender, politics, globalization, and inequity, and how they affect susceptibility to contracting malaria. The current RBM campaign put forward by the government of Ghana is an investment initiative that provides a "people first approach," and aims to understand how multi-level factors influence the participation of marginalized communities in Ghana in reducing the prevalence of malaria (Unicef, 2007).

Public health and its practitioners can respond, advocate, and lobby to improve knowledge about malaria by providing educational resources regarding bite-

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prevention through the use of insecticide-treated mosquito nets, indoor sprays, seeking early diagnosis if unwell, and taking antimalarial tablets prophylactically (Carter & Mukonka, 2017). Public health efforts are further supported by the Ghana RBM that establishes health services using the Global Fund which has been set aside to support the control of malaria. Ghana may also benefit from collaborating with inter- and multi-sectoral organizations such as Unicef, WHO, Department for International Development (DFID), and the US President's Malaria Initiative (USPMI), and by making prevention and treatment strategies more readily available (GHS, 2017). There are many factors that must be taken into account when fending off or decreasing malaria in poverty-stricken countries such as Ghana, and it is important for the government to take into consideration the SDH as they are necessary for reducing health inequities and improving overall health. By doing this, government sectors and civil society can then take global action when it comes to discussing and managing malaria.

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