Vector-Borne Diseases: Malaria in Sub-Saharan Africa

Andrea Person

George Mason University

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Communicable diseases are everywhere! They are like rabid dogs, waiting to prey on its next victim. From HIV/AIDS, to cholera, to polio, transmissible diseases come in all forms and attach themselves to anyone/anything. In this day and time, humans are left vulnerable to infectious diseases from vector sources. Diseases transmitted this way are known as vector-borne diseases. Specifically, this transmittable disease is caused by an infectious microbe that is spread to people by blood sucking arthropods. These vectors can include mosquitoes, ticks, lice, mites, etc. This is perhaps the scariest form of disease out there because it is hard to track. In particular, malaria is spread through the bite of a female mosquito. It is quite impractical to rid the world of all female, disease-carrying mosquitoes. It is even more so impossible to differentiate between those female mosquitoes that hold malaria and those that do not. So what do we do? In this paper, I will present a case study on the control of malaria within developing communities in Sub-Saharan Africa. The goal is to help better understand the danger of malaria and learn what actions can be taken to lower the risks of those in developing countries.

Methodology/Measurement of the Issue

Malaria is not new to mankind. It has been around for centuries, killing a vast number of humans along the way. In an article, Mark Honigsbaum goes on to state, “Even today, the disease kills some 850,000 people a year, the majority of them women and children below the age of five” (Honigsbaum, 2010). But the underlying

question is, do all mosquitoes carry this disease? The CDC answers this by stating, "There are approximately 3,500 species of mosquitoes grouped into 41 genera. Human malaria is transmitted only by females of the genus *Anopheles*. Of the approximately 430 *Anopheles* species, only 30-40 transmit malaria (i.e., are "vectors") in nature" (Anopheles Mosquitoes, 2012). Furthermore, the genus *Anopheles* contains species that inhabit almost every portion of the earth (**Refer to Figure 1**). This goes to show why it is so hard to completely eradicate malaria.

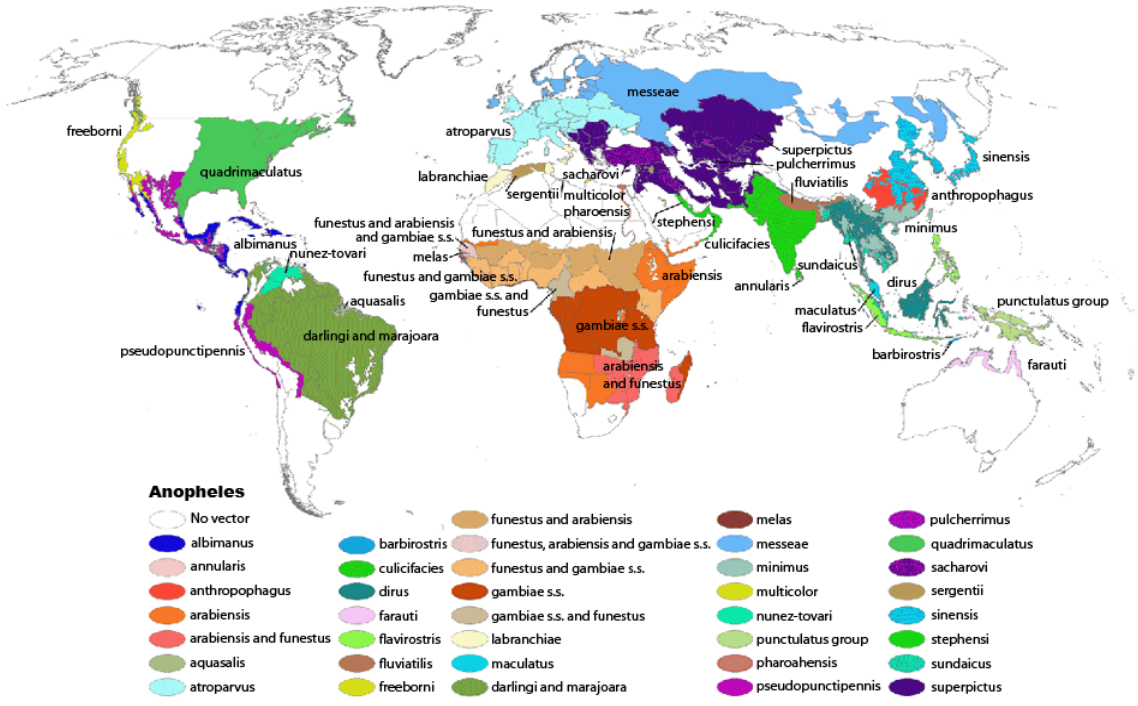

Figure 1: Global Distribution of Dominant of Potentially Important Malaria Vectors

With that being said, there is room for hope: "…in malaria-endemic countries …the efficient distribution of ACTs and bed-nets has cut morbidity and mortality from the disease by up to 70 per cent" (Honigsbaum, 2010). With persistent action from the government and funding from international corporations/foundations, mankind

does stand a chance to lower the prevalence and effects of malaria. In the following sections, we will look at the region of Sub-Saharan Africa, then focus in on one of its specific countries, and discuss their triumphs.

Sub-Saharan Africa

Sub-Saharan Africa has taken the greatest hit from malaria (**Refer to Figure 2**): "Approximately 90% of all malaria illness and death in the world today occurs in sub-Saharan Africa" (Yartey, 2006, p. 364). This particular case study focused on malaria during pregnancy. According to the article, "Malaria exacts its greatest toll on pregnant women and children, killing an estimated 1 to 2 million children each year and causing illness in a further 300 to 500 million individuals" (Yartey, 2006, p. 364). The WHO decided to take a stance against the issue and declared methods to fight against this problem: "The package of interventions consist of: (i) intermittent preventive treatment (IPT) of asymptomatic pregnant women, (ii) use of insecticide-treated bednets (ITNs) and (iii) prompt and effective case management of malaria illness and anemia" (Yartey, 2006, p. 366). Many countries in Sub-Saharan African countries adopted this three-pronged approach. With the use of ITNs, it has been shown that "…areas…demonstrate women who were protected by ITNs gave birth to approximately 25% fewer babies who were either small for gestational age or born prematurely than those not protected by ITNs" (Yartey, 2006, p. 367). These results go to show that a strategic approach to combat malaria does yield progress and success.

Tanzania

In the case of Tanzania, it is noted “Every year, 14 million to 18 million new malaria cases are reported in Tanzania, and 100,000–125,000 deaths occur. The annual incidence rate is between 400 and 500 per 1,000 people, and this number doubles for children less than five years of age” (Caldas de Castro et al., 2004). Because the numbers were so devastating, the country decided to take a stance on the matter: “Multiple interventions were used in the vector control component of the program. These included chemical larviciding, indoor residual house spraying (IRHS), space spraying of insecticides at ultra low volume (ULV), ITNs, and environmental management” (Caldas de Castro et al., 2004). Perhaps the projects greatest accomplishment was, “…the stereoscopic aerial photo interpretation routine that allowed the rapid identification of potential breeding sites and the elaboration of malaria risk maps” (Caldas de Castro et al., 2004). This allowed the government to locate and focus on specific areas of mosquito breeding grounds and the nearby populations that were most affected by the athropods. Finally, by the end of the project, “…malaria prevalence rates among school age children were reduced by approximately 50%” (Caldas de Castro et al., 2004). With the continued use and implementation of the project, Tanzania will be able to accomplish much more in their fight against malaria and the arthropods that carry it.

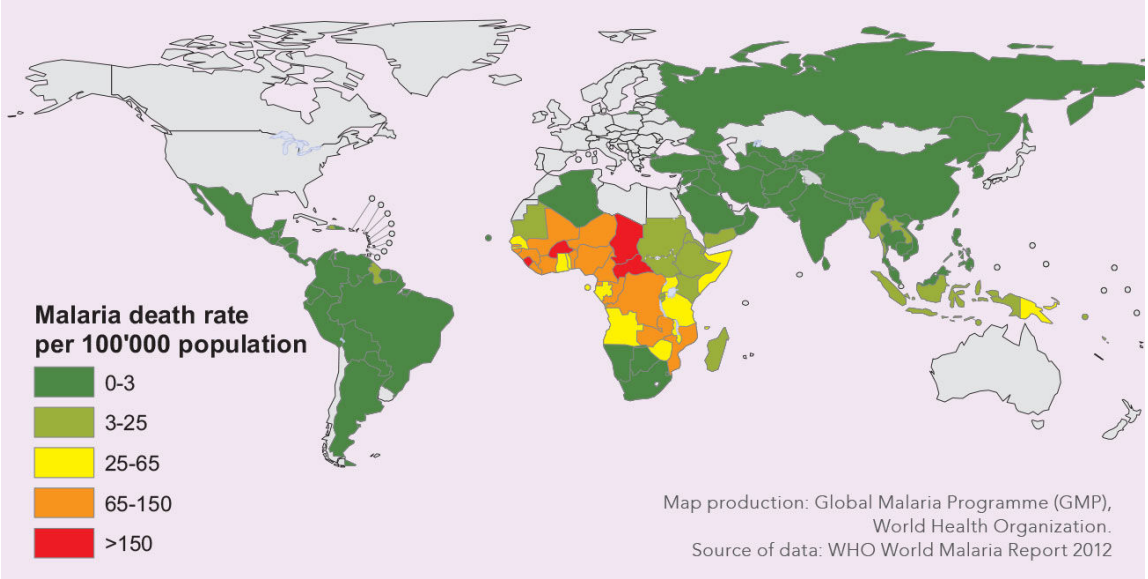

Figure 2: WHO World Malaria Report

Analysis

The first case study presented in Sub-Saharan Africa discussed the steps WHO took to battle malaria in pregnant women. One of its effective methods was the use of insecticide-treated bednets (ITNs). These bednets hang from the ceiling and users are required to sleep in them throughout the entire night. In just a short period of time, it was shown that these bednets succeeded in its job. It was revealed that 25% fewer babies were born prematurely because of the mother being infected with malaria.

The second case study presented in the Sub-Saharan African country of Tanzania talked about the methods its government took to lower the risks of malaria. By creating visuals and maps of breeding grounds for mosquitoes, the government was able to locate and decipher where to spray the insecticide and which nearby communities were most at risk for infection. It was mentioned that by

the data collected from the aerial depictions, there was a reduction of malaria in 50% of school-aged children.

Conclusion

As you can see, malaria is a destructive disease. It has been around for hundreds of years and has infected hundreds of millions of people through its journey. Governments and international foundations have taken a stand to end the harmful effects of this vector-borne disease by contesting the mosquitoes that carry it. The regions of Sub-Saharan Africa and its country Tanzania have seen progress in the efforts made to cut down the consequences of malaria. With continued funding and active government intervention, malaria can be put to bed once and for all.

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