

Shah S. *The fever: how malaria has ruled humankind for 500,000 years*. India: Penguin Random House India; 2018.

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The elimination of malaria, the oldest and most deadly disease in the world, challenges public health¹. In 2017 there were 219 million cases of the disease and 435,000 deaths worldwide. The number of cases increased from 2016 to 2017 in the 10 countries with the highest disease burden and the poorest: Africa¹.

Of the malaria cases in Brazil, 99% occur in the Amazon. Amazonas and Acre account for 60 to 70% of cases in the Region and in the country² and those for *Plasmodium falciparum* account for 75% of all cases. Most of these cases occur in cities bordering Peru. This phenomenon is mostly due to changes of environment by humans; acceleration of fishing activity; migration². However, *P. vivax*³ is responsible for 90% of cases in Brazil, and this reality challenges its control, since these cases are characterized by years of onset and asymptomatic infections that favor the maintenance of the parasite reservoir².

There is no Brazilian state that does not live with the presence of malaria and three disease transmission systems were identified in the country: the Amazon Rainforest, the Atlantic Forest, and the Brazilian Coast (most of the Northeast, including part of the North and Northeast, in the coastal region)². The first two systems are the main ones².

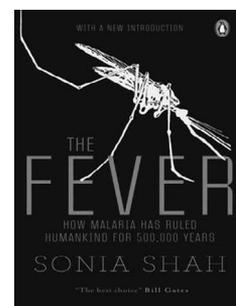
The mosaic of the malaria situation in Brazil, with different species of infectious plasmodium involved and cases in all states, suggests the need for continued studies to develop public policies. The book “*The Fever: How Malaria has ruled humankind for 500,000 years*” by American journalist Sonia Shah, therefore, is timely. In the book, the relationship between humans and plasmodium is densely explored by the author, who is not from the health sciences field, but has insertion in this field of knowledge. The origin of Shah’s relationship with malaria comes from his family relationship with India; since her childhood the author visited the country, and those visits have called her attention to the disease in the context of inequity and poverty. This personal aspect is a strong point for those who are looking for memories and

extensive and detailed narratives that comes close to literature. However, there are also disadvantages to this option: descriptions of research on malaria, a clearly preferred theme of the author, are quite long and Shah still devotes disproportionate space, for example to the Harvard Malaria Initiative. Further in the book there is a long foray into the theme of parasitism without necessarily referring to malaria, leading the reader to distraction from the text focus.

The causative agent of malaria, protozoa *Plasmodium spp.*, is highlighted in the book. From the reflection that diseases become progressively less virulent, Shah shows how its parasitic action contradicts ecology. It addresses the evolution of protozoan from its ancestors and how they evolved with the *Anopheles sp.* and later to humans, incorporating ways to circumvent their immune systems and to use organisms to their advantage. An animal study by Brazilian researchers points out that plasmodium actually takes advantage of host food intake and nutrient availability to proliferate⁴; the study proceeded to identify that glucose levels, when controlled, would contribute to the decrease of parasite replication, and this finding may help in the formulation of therapies⁴.

Malaria transmission depends on specific environmental conditions and how environmental disturbances are associated with new disease epidemics. In the book the following are approached as human interference on the environment and the consequent epidemiological changes allowed: rise and fall of the Roman Empire; US geopolitical formation; definition of the courses of the first world war. In addition, the author mentions how the Brazilian agricultural and mineral expansion generated favorable environment for the protozoan transmission in the country. It is also known that, in Brazil, slavery abolition in 1888 led to the abandonment of agriculture and consequent interruption of irrigation and drainage systems in plantations in Rio de Janeiro and São Paulo: malaria began to affect this population for decades⁵. Adequate stormwater drainage and other environmental sanitation strategies, already identified as important in flood-related disease control in urban areas, are not yet fully adopted in Brazil⁶. By describing the effect of these unfavorable conditions, the book may help to leverage environmental policies to reduce malaria transmission in Brazil.

The emergence of drugs such as quinine, chloroquine and artemisinin, each considered in its proper historical moment, is also noteworthy in “*The Fever*”; It is argued that they have always been presented as hope for eradication of the parasite. In Brazil the author emphasized the erroneous strategy of Chloroquine salt. Recently, artemisin in combina-



tion with lumefantrine for treatment – according to Shah, drug launched by Novartis to contain parasite resistance – is used in major hospitals in Amazonas⁵. Shah argues that the effectiveness of all the drugs tested so far in the world has diminished over time by the selection of resistant strains. The effectiveness decrease far outweighs the ability to produce new drugs. This view is corroborated by Griffin et al.⁵: *The twentieth century has shown that antimalarials and insecticides are effective control methods if they do not fail. Unfortunately, they all seem to fail*⁵(p.715).

The Brazilian public policy experience includes the use of DDT (dichlorodiphenyltrichloroethane) to eliminate the adult mosquito population, and this aspect is also presented in the work. With the discovery of DDT the focus of control strategies around the world has shifted to eliminating the adult mosquito population. In Brazil, DDT use occurred throughout the Amazon in 1960, and indoor use was banned in 1999 given that toxicological and ecological risks were proven^{5,7}. The author really points out that there was DDT contamination of the entire food chain on a worldwide scale.

Education and involvement of affected populations to eradicate the disease in this difficult context of malaria control is crucial in communities. However, these actions faces challenges: for Shah, victims of some populations who are so used to the symptoms and frequency of infections do not seek care or adhere to treatment. The search for help often occurs only in extreme and often irreversible situations, and there is also low enthusiasm of local teams to treat malaria, due to the feeling of helplessness regarding the coexistence of communities with the parasite. Unfortunately, there are still mistaken chemical control practices in most Brazilian cities, such as the spatial application of insecticides without entomological or epidemiological technical criteria in the routine of health services⁷. Although the control of malaria in Amazon has evolved, it occurs in places with low transmission, where the greatest difficulty to reduce this transmission occurs, requiring greater mobilization of health teams, which is the current major challenge⁷. The use of new indicators for malaria monitoring has been successful in Brazil,

and the need to strengthen local entomology teams to carry out control measures is recognized⁸. However, reflections on community mobilization have not been identified in the Brazilian literature. Therefore, aspects presented and discussed in “*The Fever*” can be helpful in understanding these local community mobilization and engagement strategies.

In conclusion, for the author, anti-malarial work should unleash technology, political will and infrastructure in the countries. In Brazil and around the world, the work can assist policymakers in formulating strategies to address the origins of malaria illness and disease outbreaks, given Sonia Shah’s portrayal of the various spaces where malaria occurs, seeking to understand how it can be contained.

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