

# Indigenous Knowledge Systems and Innovations in Malaria Control in Nigeria



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## Abstract

Controlling Malaria from a Nigerian perspective as part of the Millennial Development Goals calls for the exploration of indigenous knowledge systems that are usually ridiculed and aggressively combated by big pharmaceutical companies eager to protect their patents on biomedicines that yield huge profits without providing sustainable panacea for enduring plagues that affect mostly the tropics. Similarly, Nigerian bureaucrats who benefit from huge international funding targeted at malaria may frown at any indigenous approach that cuts costs and still delivers effective care for patients. Our innovation promises a drug-free and therefore cost-free intervention that would equip the poor and the rich alike with knowledge of self-efficacy to help the world get rid of *Plasmodium falciparum* malaria once and for all. The approach derives from my book, ADAM: Africana Drug-Free Alternative Medicine, which has provided reliable principles for effectively preventing or treating various health conditions but which require funding support for large scale randomized clinical trials to standardize the findings for the benefit of all.

**Keywords:** Malaria; *Plasmodium falciparum*; Africana drug-free alternative medicine

## Introduction

The WHO Malaria Report 2015 evaluated efforts towards the eradication of malaria globally and found that cases declined from 260 million in 2000 to 214 million in 2015. However, while infection declined globally, 88% of the reported infections occurred in the African Region with an additional 10% in Southeast Asia and the remaining 2% in the Eastern Mediterranean. The report indicated that funding for malaria eradication increased from \$960 million in 2005 to \$2.5 billion in 2015 worldwide and there appears to be a negative correlation between levels of funding and rates of infection and mortality.

The African region was shown to be the only region that relied mainly on increased international funding while indigenous government funding remained flat during the period. The poor African funding situation is indicative of the poor economies in Africa and the competition for scarce resources between healthcare and other government programmes [1]. Our intervention seeks to test an innovative hypothesis that postulates a negative relationship between a drug-free and therefore cost-free intervention and reductions in malaria mortalities in Africa: The more our approach is implemented, the less the rates of infection and mortality and the less the costs.

If supported by the evidence, this may help the entire world to get rid of malaria in a sustainable way that is accessible to all.

Indigenous knowledge systems are usually discarded in preference for big pharmaceutical prescriptions that promise silver bullets capable of taking out the pathogenic agents that cause diseases. But if after a hundred years big pharmaceutical companies have failed to provide a solution for malaria while raking in huge profits, it will be madness to continue doing the same thing and expect different results. The anti-malaria drugs with severe side-effects gradually fail as the parasites acquire immunity to them and millions of people continue to die. In 2015, a Chinese scientist was awarded the Nobel Prize for Physiology in recognition of the effective application of traditional Chinese medicine to the malaria epidemic since the 1960s. This paper presents an opportunity for Nigerian researchers to shift the paradigm from biomedical obsessions with silver bullets and look at the indigenous knowledge systems that equipped our people to survive for thousands of years in malaria infested terrains and still reproduced enough to be the sources of millions of enslaved people transported away for four hundred years, and still remained thickly populated. Our ancestors obviously survived by relying on local remedies and by building

natural immunities that the white man came to weaken with over-reliance on quinine, a medication with many side-effects that was derived from plants that American Indian Natives had used for centuries to deal with malaria effectively.

My paradigm shift derives from my life-long training in indigenous knowledge systems by my parents who were healers and who inducted me into the African healing arts as a child. Like the majority of African herbal healing practitioners, my parents also emphasized herbs to be taken by patients and they taught me some of the herbs they knew. The danger in herbalism is that the lack of standardization could easily lead to overdosing and complications especially when the herbs interact with prescription medications which themselves carry enormous side-effects that often prove fatal. My move away from home for university education challenged me to find ways of staying healthy if the local herbs I was taught by my parents could not be easily found in the new urban environment of my university. I consciously started applying my knowledge of social science research methodology to my own body and started observing regular bio-feedback mechanism that helped me to predict oncoming attacks of illness and effectively respond to prevent a full blown attack without relying on drugs on herbs. My findings on effective remedies for several chronic diseases are chronicled in ADAM: Africana Drug-Free Alternative Medicine. This effective drug-free approach is what I propose to explore to help us to develop a Nigerian intervention against malaria [2].

When Nelson Mandela signed a law to support African researchers to find effective alternatives to expensive foreign drugs for HIV/AIDS, he was sued by more than 40 big pharmaceutical companies that claimed that they deserved to charge any amount of money they wanted because they held the patents on HIV/AIDS drugs. This reminds us of the ethical dilemma of Mr. Heinz, the hypothetical defendant in the case that is used to teach law students about ethical choices: His wife was ill with cancer but he could not afford the drugs that the patent holder priced above his means and so he attempted to steal it to save his wife. Many students say that two wrongs do not make a right and so he should have begged or tried to raise the money somehow while others say that the drug maker should have donated the drug to save Mrs. Heinz. My approach is a paradigm shift that says that the panacea may be drug-free and cost-free if only researchers could be supported to look outside the box of commercialized medical models. President Barack Obama's administration faced a similar dilemma as dozens of states and employers tried to sue him to stop the Affordable Health Care Act on grounds that it was unconstitutional for the federal government to provide health exchanges that would make health insurance affordable to citizens in states that refused to set up such exchanges. My radical departure promises to enhance wellness free of charge by relying on drug-free principles that have been tested and proven on small scales and that might just be the good news that the poor and the rich are waiting for

around the world. What if malaria can be naturally controlled by our bodies without the need for costly and harmful drugs or herbs? Then there would be no reason for big pharmaceutical companies to sue anybody for recommending natural remedies.

### The Idea

Our idea is an unconventional approach to malaria treatment because our hypothesis is both counter-intuitive and intuitive. Counter-intuitively, it could be argued that malaria weakens the body of the patient and so fasting for 24 hours once a week would make the patient even weaker. To prevent harm to the human subjects, the kind of fasting we anticipate is only fasting from solid carbohydrate and protein food without oil, salt and sugar (but those who are strong enough to try a water-only fast should be encouraged to do so). Hence the volunteers could feast on fruits or vegetables and or drink lots of water during the weekly 24 hours fast. This kind of fast is called the white fast by groups in West Africa but they usually break the fast at dinner (after 12 hours or less) by eating large quantities of white rice, eating white bread or consuming huge portions of garri (a cassava paste that is rich in carbohydrate), yam, millet or corn meals.

World leaders have called for a 24 hour fast against malaria to raise awareness and also raise funds. Little did they know that doing this periodically could be part of the solution to the epidemic. We are calling for randomized trials as part of the intervention without assuming that the ingestion of a drug or herb is the only possible solution, it could be the case that abstinence from food is what is needed for 24 hours once weekly to give the immune system a boost and weaken the parasite but without starving the people.

We plan to recommend abstinence from carbohydrates and proteins but indulgence in liquids and or fruits or vegetables for 24 hours weekly by the patients contrary to the convention that patients should be well fed to give them strength to fight the virus because it may be the virus that they are feeding. The result of periodic fasting in the general population may be greater ability to ward off diseases and quicker recovery. The risk of harm to human subjects, from 24 hours fast that is enriched with fruits and water, is very low and any risk will be promptly addressed by the hospitals by breaking the fast at any time. If the federal government designates one day a month as the national day of fasting while those capable may try this one day a week, the result may be huge improvements in the public health.

Intuitively, the Malaria patient throws up much of the food that is eaten when suffering from the disease and we hypothesize that this might be the way that the body tries to send bio-feedback communication to the patient that abstinence from food would help with the healing process. Since fasting is recommended by many cultural communities as beneficial for cleansing the body and the spirit, we anticipate that our hypothesis will make sense to patients and to the public. By some kind of coincidence, the

Muslim majority countries in Northern Africa that regularly practice mass fasting for months annually as part of their faith also show reduced incidence of malaria compared to the rest of Africa, according to the WHO Malaria Report 2015 map from the CDC [3,4].

The exception here is that North West Nigeria which is also predominantly Muslim also has the highest reported cases of Malaria in Nigeria while the South East region that is predominantly Christian has the lowest reported rates of infection. It would be an ecological fallacy to attribute this variations entirely to the practice of periodic fasting but it should be noted that evangelical Christians in the South East are known to practice long periods of fasting and that South East Nigeria may have boosted immunity as a result of the enforced starvation experienced during the civil war [5]. The more likely reason, according to the WHO Cooperation Strategy report on Nigeria is that literacy rates among women in the North West and the North East are as low as 8% while it is over 90% in the South East. The regions of Europe and North America that have eliminated malaria are also known to have higher literacy rates and to follow dieting programs with emphasis on low carb diets while Black Africans appear to instinctively obsess about food perhaps due to persistent scarcity and insecurity. We do not envisage any serious harm to human subjects as a result of periodic 24 hours of fasting mediated by a feast of fruits and lots of water. Once this bio-feedback mechanism is learned as effective, wellbeing is sustained because this is a drug-free and therefore cost-free method that is accessible to all [6-9].

Our hypothesis is that there is a relationship between indigenous knowledge systems and survival strategies or coping mechanisms for malaria. According to Hewlett and Hewlett, responses to Ebola epidemics in East Africa tended to ignore indigenous knowledge systems which they found to be part of the useful technologies in the fight against Ebola and we hypothesize that this may also be true of the more common malaria infections [10]. Not taking indigenous knowledge systems seriously enough leads to suspicion in the community that health care workers might not have their best interests at heart. This intervention aims to take the survival narratives of malaria patients seriously enough by using a classical experiment design approach to outline the major strategies of survival among malaria patients who always confess that they could not keep any food down which might be a way by which the body provides bio-feedback mechanism to demand modified fasting during the infection [11,12].

The scientific merit lies in the fact that indigenous knowledge systems are increasingly recognized for their insights into scientific problems and so studying the knowledge of Africans about Malaria may lead to original contributions to knowledge and evidence-based therapeutic procedures for dealing with similar public health emergencies. The wider impact will be in the form of mentoring under-represented researchers and

motivating them to take up STEMH research careers once they realize that indigenous people are not simply the objects of science but also citizen scientists who are capable of making original contributions to knowledge.

Stories of 'How I survived *Ebola Virus*' have gone viral on the internet, providing researchers with an opportunity to analyze such stories to see what they have in common. Harvard Professor of Literature, Biodun Jeyifo, hinted at how fertile such tales are by writing a series of online newspaper columns on one such survivor whose first-hand account of how she survived was published in BellaNaija and soon was forwarded by many online. Jeyifo [13] tried to remind Nigerians that attention should not be focused exclusively on the woman's strong faith in God but also on her knowledge of medical science which she credited also with her survival. Jeyifo [13] stated that the educational system in Nigeria is facing a major crisis given that even STEM professors believe in the efficacy of religious faith compared to scientific knowledge.

Here Jeyifo was echoing the thoughts of Azikiwe [14] who critiqued the belief in superstition or super-science when we could be using the scientific method to address many of the problems of public health in Africa. According to Azikiwe [14], belief in the ability to kill someone by uttering their name from a distant location cannot be demonstrated empirically and should therefore give way to the search for scientific methods for improving public health in Africa. A couple of years later, Awolowo [15] published an essay in which he asserted that there was proof that shouting the names of enemies three times at a cross road would kill them wherever they were. It appears that many Africans will side with Awolowo on this debate and for this reason; we cannot overemphasize the need to apply scientific knowledge in the empirical testing of hypotheses to find reliable and accessible ways to treat malaria in Nigeria.

### Literature Review

A lot of the research done on malaria in Africa is of the epidemiological or surveillance type which provides vital information for the spatial targeting of limited resources in the fight against the diseases. For instance, Alabi et al. [16] found that malaria accounted for 45% of the deaths of children under 12 and 14% of those over 12 in their survey in North West Nigeria. While this information is useful, Nigerian researchers should be encouraged to explore hypotheses derived from indigenous knowledge systems for the purpose of discovering cost-effective alternatives that may help our people to reduce the death rates without necessarily increasing the budget excessively. For instance, Eisele et al. [17] evaluated the efficacy of Insecticide Treated Nets as protective measures in endemic regions and found that this proved vital in saving lives, leading them to conclude that the program should be scaled up. Such experiments should be conducted by Nigerian scientists too but given that most Nigerian families cannot even afford the

Insecticide Treated Nets for all their children and given that mosquitoes do develop resistance to insecticides, the emphasis of Nigerian researchers should be extended to indigenous knowledge systems. According to the WHO Country Cooperation Strategy report on Nigeria, 'The use of insecticide-treated bed nets increased from 8% in 2008 to 50% in 2013, but malaria is still responsible for 30% of childhood mortality' [18,19].

Thien et al. [20] reviewed research evidence that suggests that hypoglycemia is a common complication in malaria patients but concluded that fasting needs to be studied more directly as a possible causative factor. Only one of the research reports that they reviewed claimed that fasting may be causative but that research did not adequately test the fasting hypothesis. The review by Thien et al. [20] suggest that involuntary anorexia (vomiting after eating) may be part of the reasons why malaria patients may have low blood sugar that could lead to complications that may end in fatalities. They also reported that the malaria parasite feeds mainly on blood sugar and this may be responsible for the low blood glucose in patients. In other words, either the patient is starving due to inadequate intake of nutrients and or the parasites consume the glucose produced by the patient and leave the patient vulnerable to complications that may end in brain damage and even death. However, hypoglycemia is found to be common among children admitted for other health conditions and may even be less among children dying with malaria in the Gambia, Malawi, Mozambique and Kenya. Hypoglycemia is more common among malaria patients who were children and pregnant women than among adults especially if starvation goes on for 86 hours, much longer than the 24 hours we recommend. To prevent such complications, I recommend modified fasting with fruits and liquids intake to avoid hypoglycemia for 24 hours per week during the intervention. Our proposal is in line with the conclusion of Thien et al. [20] after noting that drugs like quinine also contribute to hypoglycemia and their call for more research on the risks of fasting:

Further research studies are needed to support or to refute the possibility of fasting as the principal risk factor for hypoglycemia in falciparum malaria - a risk factor that so far has been emphasized insufficiently. This omission is not without consequence because the relatively simple measure of health education (encouraging mothers to try to continue feeding) and administration of glucose, either intravenously or by nasogastric tube on clinical suspicion, could help both to prevent this potentially dangerous complication and to reduce its deleterious effects (p.414).

According to Dr. OtengGyang [21], diet plays a role in the treatment of malaria by naturopathy experts who insist that over-consumption of meat and processed starch tends to clog up the digestive system to create an environment suitable for parasite to thrive. Some naturopathy experts recommend a few days of fasting on orange juice to help the body to recover naturally from infections. However, according to Dr. Obeng Gyang [21], there is

no evidence to support this recommendation that fasting may be an effective response to infections like malaria but Dr. Gyang is wrong on this conclusion given that there is a lot of evidence to support the approach.

Our hypothesis suggesting that fasting may actually be more therapeutic under clinical supervision has support from medical researchers. Thus the medical education advice to mothers to continue feeding may indeed be contributing to the feeding of the parasites whereas fasting could starve the parasites and boost the natural immunity [22-25]. There is evidence that fasting could strengthen the body to help fight off infections. Known as 'Dr. Fast' for his medical practice based on the efficacy of supervised fasting as the panacea for viral infections and many auto immune diseases, Dr. Adrian Kruger has published his findings as *Health Won* and the e-book strongly supports our hypothesis that malaria could be combated through fasting. It has been reported that short-term starvation or fasting in rats helps to treat cancer tumors and that this suggests that human beings could benefit from fasting as part of the healing process and by extension, in recovering from malaria. According to the researchers, fasting could be good for human beings generally.

Following research by Ancel Keys and colleagues on the effectiveness of fasting for reducing infections, Joel Fuhrman reported that there is abundant evidence that clinically supervised fasting can be a part of the healing process against viral infections. Fuhrman, Sarter and Calabro also reported in 2002 that medically supervised water only fast helped patients with autoimmune diseases [26]. Randi Fredericks supports these findings. Further support is found elsewhere: "Fasting is an exceptionally ancient and powerful, approach to healing many common disease conditions." Further indirect support for our hypothesis is found in the following report on yellow fever [27].

"In previous studies, patients consuming a protein-sparing modified fast (PSMF) did not develop the expected increase in nitrogen excretion following incidental infectious illness. To assess the catabolic response with a controlled infection in such patients, 17-D yellow fever vaccine was administered to four young obese adults after 3 weeks of this hypocaloric regimen (PSMF), essentially carbohydrate-free and providing 1.5 g protein/kg ideal body weight.'

Although yellow fever is a different viral infection compared to malaria, the fact that 'essentially carbohydrates-free diets and reduced protein modified fast, adherence to rest, and lots of fluid intake are recommended for yellow fever patients encourages us to explore the hypothesis that fasting, lots and lots of fruits and water would be beneficial for malaria patients too. As the above study indicates, fasting and abstinence from carbohydrates are recognized as part of the response to the viral infection of yellow fever [28,29]. If our hypothesis is supported by the evidence, then a rapid response to the malaria crisis may be possible without a huge increase in costs to the patients nor to the community by

trying fasting with lots of fluid once the early symptoms of fever, cold, dry cough and headache manifest.

### Methodology

We propose a randomized clinical trial of a natural intervention without huge risks for patients to see if ADAM: Africana Drug-Free Alternative Medicine might have answers to the epidemic that haunted me as a child and claimed millions of our beloved people in Africa and around the world. We propose to have 500 patients randomly selected to try the ADAM principles while a control group of 500 patients try the conventional treatment. The results would be compared and if promising, the experiment would continue and be scaled up. If no significant difference is found between the two groups, the experiment would be terminated. The monitoring of the experiment by the University of Nigeria Teaching Hospital will ensure that any harm to the participants would be detected early enough and the experiment will be terminated. Since the conventional medications carry side effects just like the conventional herbs, my alternative approach being drug-free and herb-free may reduce the side effects and if any risks arise as a result of trying my hypothesis, the medical researchers will intervene to end the experiment without excessive harm to human subjects. Institutional Review Boards in Virginia Tech and in the University of Nigeria Teaching Hospital will evaluate the research design to ensure that no great harms will be done to human subjects [30].

The methodology will be consistent with Rubin's Counterfactual Model of experimentation according to which:

- a. An observed treatment (fasting and bowel-movement skills tips) is given to an experimental group of 500 volunteers (250 may try water-only fast and 250 may try water and fruits fast). The outcome of that treatment is  $Y(1)$ .
- b. The counterfactual is the outcome that would have happened  $Y(0)$  if the group did not receive the treatment, control group of 500 volunteers (no fasting).
- c. An effect is the difference between what did happen to the experimental group and what happened to the control group (measured in intensity of Malaria infection): Effect =  $Y(1) - Y(0)$  (cited in Shadish, Cook and Campbell, 2002).

Hypothesis 0: There is a relationship between fasting and malaria epidemiology

Hypothesis 1: There is no relationship between fasting and malaria epidemiology

We propose to have 500 patients fast weekly for 24 hours with fruits or vegetables and water while the control group of 500 patients will be fed and the two groups will be compared in terms of parasite positivity before and after the intervention. If the results are statistically significant, we will recommend the scaling up of the clinical trials for an eventual eradication of

malaria parasites globally at no cost, reduced side-effects, and with a method that will be accessible to the rich and the poor. If the results are not statistically significant, the experiment will be halted but the need for more randomized clinical trials in medical research in Nigeria will be emphasized as the way forward. Past results at the anecdotal level encourage me to predict a significant result in support of my hypothesis but to avoid any bias, we will test the null hypothesis that suggests that my original hypothesis will be proven false. If the evidence supports the alternative hypothesis, we will reject my original hypothesis but if the evidence does not support the alternative hypothesis, we will affirm the original hypothesis.

### Evaluation

Scholarly panels of experts will evaluate the scientific merit of this trial and the wider impacts of the project. Also, the papers to be presented at professional meetings and articles to be submitted to peer-reviewed journals will attract evaluations from experts. In the absence of funding for this hypothesis, citizen scientists and organizations are welcome to conduct the experiment and report their findings. There is no great risk of harm to human subjects from a brief fasting period and there is evidence that it is beneficial.

### Conclusion

Across Africa, public campaigns of national days of fasting may be observed as part of the efforts to improve the immunity of Africans to infections like malaria without huge costs. Perhaps, Ezulu, in Chinua Achebe's *The Arrow of God*, was trying to tell Nigerians a thing or two about survival through deliberate fasting by refusing to eat the sacred yam when a great disaster was staring the community in the face. Our people have been starved for so long that the idea of voluntary abstention from food sounds incredible despite the fact that both Christian and Muslim religions emphasize the need for periodic fasting for the purification of the body. Our hypothesis may prove a scientific basis for the restoration of the self-efficacy of our people against an infection that our ancestors had handled mainly through natural immunity before the white man came to discover that West Africa was the white man's grave and proceeded to produce drugs that lulled us into weakened immunities, drugs that the mosquitoes quickly became resistant to. The development of indigenous knowledge systems against malaria is crucial given that 'Despite considerable efforts over the last three decades, and millions of dollars spent, there is still no registered vaccine against *Plasmodium falciparum* malaria.' Nigerians should not fold their arms and wait for a vaccine to be developed and patented by western researchers without exploring indigenous knowledge systems that may even prove more effective and more sustainable.

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