Kenya needs cohesive policies and better strategies in its war against malaria in arid and semi arid areas

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Abstract:
Malaria is the greatest killer parasitic diseases in the world today. Kenya falls amongst the 15 high-burden countries in sub-Saharan Africa. Due to this, the Kenyan government and its development partners launched the President's Malaria Initiative (PMI) to reduce malaria related mortality by 50%. This was to be achieved through a rapid scale-up of four proven and highly effective malaria prevention and treatment measures: insecticide-treated mosquito nets (ITNs); indoor residual spraying (IRS); accurate diagnosis and prompt treatment with artemisinin-based combination therapies (ACTs); and intermittent preventive treatment of pregnant women (IPTp). Though the contributions of PMI, together with those of other partners, have led to dramatic improvements in the coverage of malaria control interventions especially in the high burden regions of the county, malaria outbreaks are frequently reported in the arid and semi-arid land (ASAL) of Kenya like Baringo and West Pokot Counties. In this Opinion, I try to address some of the reasons that could be the cause of these frequent malaria outbreaks in the ASAL regions and what could be done to reduce them.

Keywords:
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1.0 Introduction
In the past 15 years, Kenya where 70% of the population is believed to be at risk of Malaria has made great strides in the prevention and control of Malaria. Countrywide, malaria prevalence dropped from 11% to 8% between 2010 and 2015. During the same period, Malaria which is pervasive along the Lake Victoria region dropped from high rates of 38% to 27%. A 29% drop in overall child mortality due to Malaria between 2008 and 2014 has also been witnessed [1]. These have been achieved by a broad range of prevention efforts tailored to meet the widely divergent needs of local populations. Insecticide-treated bednets have been the primary preventive tool whereas indoor residual spraying (IRS) with insecticides is targeted towards selected areas with high prevalence and transmission around Lake Victoria. By April 2017, Kenya had distributed 16 million Long Lasting Insecticidal Nets (LLINs) in 36 counties through mass campaigns and routine maternal and child welfare clinics. The LLINs and the IRS have been accompanied by the diagnosis-based treatment policy and supply of preventive medicine. Currently 87% of public health facilities have diagnostic capacity. There has also been health promotion messages broadcast nationally, even to low transmission areas, so residents can learn how to limit their exposure and, if they do fall sick, recognize the symptoms and get diagnosed and treated. It’s evident that these measures have greatly impacted to the low transmission rates being witnessed [1].

Still, progress has not been uniform. There is need to sustain high coverage of malaria control measures to the seasonal malaria transmission zones. As recent as February 2018 and October 2017, Kenya has witnessed outbreaks of Malaria in its arid Counties of Baringo, West Pokot and Marsabit. Tens of Malaria cases were confirmed in Baringo in February 2018 with 20 of them described as serious [2] whereas at least 400 people were hospitalised in West Pokot and Baringo counties during a malaria outbreak in October 2017 that killed more than 10 people [3]. Another ,1, 300 people were admitted with malaria a week after the disease
claimed 17 people in Marsabit County in the same month. Majority of the patients were children under the age of 5. Sadly, it is that age that gets ravaged by Malaria so badly that in every 2 minutes somewhere in the world, a child is lost to this killer disease [4].

2.0 Previous research findings in Baringo and their implications on Malaria control

Malaria accounts for 11.8 % of the outpatient cases recorded in Baringo [5] This is higher than the nationwide malaria prevalence of 8% [1]. The County falls under the seasonal malaria transmission zone together with other counties including; Turkana, Kajiado, Mandera, Wajir, Garissa, Marsabit, Samburu, Isiolo, Meru, Tharaka Nithi, Embu, Kitui and Tana river[6]. Seasonal malaria experienced in these counties is associated with periodic amplification of morbidity in the wet season prompted by limited immunity in inhabitants

It has been reported that increased number of malaria cases in Baringo occurs against the backdrop of sub-optimal performance in health facilities due to structural problems/weaknesses such as lack of malaria drugs, under-staffing, inadequate medical equipment and sparsely distributed health facilities (the average distance patients travel to health facilities is 15 kilometres) [5]. Insecurity in the region also aggravates the problems as medical staff like nurses are reported to flee the few Medical facilities due to the persistent insecurity [2]. This leaves communities to identify and manage the disease largely on their own even during outbreaks.

On the other hand, entomological research has observed that the Anopheles arabiensis mosquito that readily feeds on not only humans but livestock too is one of the main malaria vectors in Baringo. Livestock keeping is the main economic activity in Baringo, this coupled with previous findings that breeding of the An.arabiensis is largely sustained by man-made larval habitats like pan dams, marshes and adjoining drainage canals used for irrigation, is evidence enough that Malaria outbreaks are likely to occur. During the dry season, the vector is sustained by the man made habitats that are less dependent on rainfall. The habitats then act as vector inocula to the natural larval habitats like rivers during the rainy season [7].

Entomological research also reports that entry and/or exit of malaria mosquitoes into houses largely depend on house type. There is a strong preference for grass-thatched houses, making house modification to limit mosquito flight into houses a plausible control strategy. This finding reinforces the common belief that poverty is a major driver of malaria transmission in Africa. Most communities in the continent's rural and resource constrained areas are largely unable to afford decent housing with adequate screening measures to block mosquito entry into houses [7].

The role of human activities in increasing human-vector contact has also been cited. Herding which is a mainstay activity in Baringo and indeed, most semi-arid areas of Africa could be a major cause of malaria outbreaks. Since as already mentioned, An. arabiensis a major vector for malaria in Baringo feed on livestock, high livestock densities would mean high human biting rates. The situation is worsened by the fact that the largest communal grazing fields are used by hundreds of pastoralists from different villages. This would of course increase malaria transmission rates and thus outbreaks. Previous research also observed that a high number of Baringo residents expose themselves to infective bites when they stay out late in the evening to irrigate their farms before temperatures sky-rocket during day time [7].

3.0 A few suggestions on how the outbreaks could be reduced
The government should provide enough diagnostic facilities and equipment. Following the general elections in 2013, the health service delivery function was formally transferred to the County governments of Baringo, West Pokot and Marsabit to help eliminate malaria in their Counties. During the recent outbreaks lack of accessible well-staffed and equipped hospitals was cited as the major factors that aggravated the situation. Patients had to travel long distances for treatment. According to residents and local leaders, those who died failed to get treatment in time. Malaria is a treatable disease and time is of essence when it comes to Malaria. If patients are not attended to in time, they would most likely lose their lives. Unfortunately residents in remote villages are unable to get to nearby hospitals located kilometres away. Bad roads in these areas have even worsened the situation further as patients have to walk long distances to get to the health facilities [8]. They should also provide adequate supply of anti malarials. During the last outbreak, Marsabit County was reported to lack anti-malaria medicines and was, therefore, unable to cope with an outbreak.

The county governments could also to consider deploying Beyond Zero mobile clinics for emergencies so deaths are prevented. They could also invest on ambulances that could be used to ferry patients from far-flung parts of the Counties. The national government on its part should provide adequate security in these areas to prevent the medical staff and development partners from fleeing these areas which results in unmanned hospitals even during outbreaks [2].

Targeted larval control will also be necessary. The highly localized and focal nature of breeding sites in these semi-desert environments provides a good opportunity for targeted larval control. The habitats are few, well-defined and easily traceable. They mainly consists of pan dams, ditches, trenches and irrigation canals which make 60% of breeding sites for the malaria vectors [9] Better environmental management that includes filling up the unnecessary ditches and trenches, draining stagnant water and applying larvicides into the irrigation canals would reduce the vector population immensely.

Since Anopheles arabiensis that readily feeds on livestock and man is one of the main malaria vectors in Baringo, zoo prophylaxis, increasing herd sizes, could be a plausible vector control strategy. However, this may be counterproductive under the circumstances in Baringo where high livestock densities lead to converging of several herders in communal grazing lands. This has the potential of increasing vector densities and high human biting rates within these grazing lands and thus malaria transmission rates.

The shift from mud grass thatched huts to concrete houses with sealable windows would also reduce exposure to mosquito bites. House type has actually become an important micro-epidemiological factor in malaria transmission [9]. We can only hope that the economic progress that Kenya has experienced could help the shift from mud huts to concrete houses with sealable windows to reduce exposure to mosquito bites.

Public health education and awareness is also necessary as it will enable victims to seek treatment quickly. This will also ensure that they don’t become reservoirs for the mosquitoes to get inoculum to be injected into the next person [9]. The residents should also be educated on the cause of malaria, encouraged to sleep under insecticide treated nets and to avoid unnecessary exposure to mosquito bites. The less educated in the population should be highly targeted as previous research shows that unlike their educated counterparts who know that malaria is transmitted by mosquito bites, the less educated population in Baringo highly believes that malaria is caused by consumption of mangoes, fatty foods, sugary foods, green
maize and cow peas, sugar cane and maize stalks [9]. Pregnant women should also be sensitized of the benefits of taking antimalarial drugs during pregnancy.

One preventive tool that has not yet been deployed in Kenya is the four dose malaria vaccine RTS, S also known as Mosquirix. The vaccine is being evaluated as a potential complement to the core package of WHO-recommended interventions currently in use for prevention, diagnosis and treatment of malaria. Kenya is one of the three countries in Africa selected for the trials of the vaccine which is administered to infants from five months [10]. This Vaccine could provide a solution for residents in these seasonal transmissions zones who unlike their counterparts in the high prevalence regions like the Lake Victoria region, lack naturally acquired immunity against malaria and are thus knocked down very fast by the disease during outbreaks.

Also, with declining resources, greater efforts are needed to better target their use. The biggest funder of the Kenyan malaria control programme – the Global Fund to Fight AIDS, Tuberculosis and Malaria – announced in December 2016 that its 2018–2020 package would contain US$ 63 million for malaria programmes in Kenya, less than half of what it had been previously [1]. This leaves a huge gap. Kenya has made great strides in improving the quality of available data for decision making, but more work is required when it comes to implementation. For example, a considerable amount of data relevant to malaria control has since become available in Kenya including: the largest ever Demographic and Health Survey (DHS) undertaken in 2014-15 designed to provide measures precise at the county level [11]. These data need to be assessed especially by the county governments, to shape implementable and effective policies that could help reduce recurrent outbreaks in the Seasonal Malaria Zones.

Finally, it would be important for the international organization like WHO which has been advising the Ministry of Health and Kenya’s National Malaria Control Programme , especially on policy and strategy issues, to help Kenya progress further toward its goal of elimination of Malaria. Probably WHO should guide the country’s malaria programme review to help re-focus anti-malaria work in the seasonal malaria zones even as they maintain the efforts in the high risk areas.

It is clear that substantial progress has been made toward the objective of eliminating malaria and other communicable diseases. If the Ministry of Health and its partners remain committed to further reducing the malaria burden in the coming years a malaria-free Kenya is possible.

**Conflict of interest**

The author declares that she has no conflict of interest.

**References**


