

The Role of Man as a Component of the Environment in the Fight against Malaria

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Abstract: *Malaria is one of the deadly diseases in the world and the leading cause of death among children under five years old and pregnant women in the sub-Saharan Africa. The fight against this deadly infectious disease began over a century ago. Although a great stride has been reached, there still remain much to be done since the disease continues to show its ugly face in the sub-region and remains the number one killer among children and pregnant women. Several interventions have been put in place, all in an attempt to eradicate the disease over the years by several agencies especially the World Health Organization, yet none of the interventions has been able to achieve the desired goal though several headways have been made. It is an established fact that no single intervention has been proved to be most effective in the fight against the disease, a multiple interventions strategy is highly recommended. Despite the implementation of this strategy over a period of time, the stronghold of the disease seems not to be shaken in any way. The study thus seeks to review the available interventions to ascertain the effectiveness of these interventions in the fight against the disease and suggest ways teacher trainees can contribute to the fight against malaria.*

Keywords: Malaria, Environment

1. Introduction

Despite several efforts made over the past decade to eliminate this deadly infectious disease, the burden of malaria still remains a force to reckon with worldwide, especially in the sub-Saharan Africa. Despite being a largely preventable disease, malaria is responsible for an estimated eight hundred thousand (800, 000) deaths globally each year (White et al., 2011). Malaria remains a leading cause of mortality and morbidity among the children under five (0-4) and pregnant women in sub-Saharan Africa. Malaria is however preventable and controllable provided current recommended interventions are properly implemented.

Although a lot of success has been chopped over the years so far as malaria control and prevention is concerned, the theme for the 2017 World Malaria Day; 'end malaria for good' clearly indicate that, there is still much to be done in order to eliminate malaria or better still to reduce its prevalence to the insignificant level. Despite the deadly nature and the global burden of the disease, it is highly preventable. Several measures have been put in place over the past decade which has contributed to the reduced number of suspected malaria cases. However, no single method can be said to be the most effective; combination of several intervention measures is therefore recommended with emphasis on appropriate utilization. It has been observed that, little premium is placed on the environmental management as a tool for malaria control and prevention. Few authors who considered it however failed to recognize the dual role played by man as the host and as a component of the environment. The focus of this paper is to share ideas on the role of man as a component of the environment in the fight against malaria

The Nature and Burden of Malaria

Malaria is typically transmitted by the bite of an infective female Anopheles mosquito; transmission can also occur placentally, as a result of blood transfusion, or by needle sharing (Control et al., 2002). The normal incubation period from the bite of an infected female Anopheles mosquito to the onset of clinical symptoms is normally nine to thirty (9-30) days or longer depending on parameters such as species of the parasite, immune status of the host, infecting dose and use of antimalarial drugs or prophylactics (Control et al., 2002). Typical symptoms among non-immune individuals include fever, chills, myalgias and arthralgias, headache, diarrhea among others. In general, immunity to malaria is acquired after repeated exposure to the malaria parasite; those individuals who survive their initial infections develop some degree of immunity.

Over half of the world's population is at risk for malaria with prevalence in sub-Saharan Africa remaining the highest in the world (Maduka, 2018). Although there has been an unprecedented effort to control malaria over the past decade; including renewed political and financial commitment and increased availability of both old and new strategies and tools, malaria still represents a major health burden especially in Africa (Alonso & Tanner, 2013).

Malaria is a preventable and treatable disease, yet it is still the fourth largest cause of death or disability in low-income countries. Children under 5 years and pregnant women are at highest risk. In addition to its health impacts, malaria has direct and indirect economic impacts on households, the health system, industry, and the economy as a whole (Brief, 2011). Although no attempts have been made to estimate overall public expenditure on malaria prevention and treatment, the

numbers of patients seeking care for suspected malaria, and available data on unit costs of treatment suggest that the total cost is likely to be substantial (Goodman et al., 2000). This clearly indicates that the fight against malaria is a global issue and not an issue for an individual country or continent. There is therefore the need to join forces to combat it in a more holistic manner; a call for global action.

Malaria Control and Preventive Measures

Since the early 1900s, malaria was seen as a threat to development in areas where the disease was endemic. Diverse and meticulously planned intervention programmes were implemented by colonial masters and private entrepreneurs (Keiser & Singer, 2004). In sub-Saharan Africa, malaria is the single most important infectious disease in children, being responsible for the death of about one million children per year or 25% of all childhood deaths (Goodman et al., 2000). In addition, it has an economic impact through its effect on physical work capacity and labour productivity, child school attendance, school performance and cognitive development.

All these negative impacts give a strong signal to how devastating the disease can be if efforts are not made to match it boot for boot especially in sub-Saharan Africa. The rapid devastating nature of the disease creates fear and panic as to whether it can be controlled at all, not to talk of eradication. Campbell & Steketee however noted that, it is a feasible goal to eradicate malaria deaths and eventually all transmissions using currently available interventions, augmented with newer tools such as vaccines, which are in development (Campbell & Steketee, 2011). Several interventional strategies have been employed over the years to combat malaria and its associated negative impacts however, the disease still holds on to its threatening record globally especially in the sub-Saharan Africa. The question which comes into mind is, "How Effective are these Control measures?"

As stated by Wangdi et. Al (2018), despite the numerous available malaria preventive measures, it is unclear which of these methods is the most effective. Alonso and Tanner (2013) confirmed this by noting that, drops in disease incidence can not entirely be attributed to the deployment of specific tools. Even though Otieno, et. al (2016) noted that the reduction in the number of malaria related cases in Kenya were due to the scale up efforts of the malaria interventions available, it could not be attributed to one particular intervention or method but rather a combination of several interventions.

In the same vein, Wagni et. al stated that, "although ITNs has been found to be the only preventive measure with statistical support for their effectiveness, the role of other malaria control measures may be important adjuncts in the global drive to eliminate malaria" (Wangdi et al., 2018). There is no single formula for control of malaria in all countries or situations; each country's circumstances will determine the most practicable way to identify local problems and priorities and to design and to implement appropriate interventions. However, there are several measures which are being employed by almost every country which include insecticide-treated nets

(ITNs), indoor residual spraying (IRS), intermittent preventive treatment (IPT), diagnostic testing and appropriate treatment among others.

The Roll Back Malaria (RBM) programme which was launched in 1998 sought to bring together multilateral, bilateral, non-governmental and private organizations to halve malaria-caused deaths by the year 2010. African Heads of States in a summit held in Abuja, Nigeria in the year 2000 endorsed this campaign and pledged their utmost support.

This endorsement was so critical since about "90% of the one million annual deaths from malaria are in Africa (Abdel-Hameed Adeel & Charwood, 2004).

The Roll Back Malaria campaign focuses on:

- Insecticide-treated nets (ITNs). ITNs can reduce deaths in children by one fifth and can halve childhood malaria cases. Long-lasting insecticidal nets (LLINs) have a lifespan of about three years.
- Indoor residual spraying (IRS). Impressive historical reductions in malaria have been achieved with IRS campaigns. IRS involves spraying the walls of houses with insecticide, and it reduces malaria transmission in areas where the predominant mosquito species bite and rest indoors.
- Intermittent preventive treatment in pregnancy (IPTp). Giving antimalarial drugs on a regular basis to all pregnant women halves the risk of antenatal parasitaemia and reduces the risk of placental malaria by about two thirds. For women in their first or second pregnancy, IPTp reduces perinatal deaths by about a quarter and low birth weight by about 40% (Brief, 2011).

It is worth noting that none of these recommended measures on its own can achieve the desired results of eradicating the deadly malaria disease. It is recorded that in 1913, a German ordinance for mosquito extermination was put in place which provided legal sanction for the destruction of ponds, vessels, tins and other sources of standing water. Interventions included oiling of water accumulations, indoor house spraying with pyrethrum and drain construction. This resulted in an estimated 90% reduction in mosquito population in Dar es Saleem, Tanzania (Keiser & Singer, 2004).

Keiser and Singer (2004) therefore strongly recommend a combination of multiple interventions which include community health education and active participation in the control of malaria. They again stressed on the multiple techniques combining environmental management, effective housing designs, personal protective measures and antimalarial drug use. Many African countries have experienced a "decade of success" in malaria control, reaping very large public health rewards from achieving high coverage of control tools. The challenge that these countries now face is to maintain their control programs so as to sustain the gains. (Brief, 2011)

The role of man as a component of the environment in malaria control

Humans impact the environment in several ways. Common effects include decreased water quality, increased pollution and greenhouse gas emissions, depletion of natural resources and contribution to global climate change. Some of these are the direct result of human activities, whereas others are secondary effects that are part of a series of actions and reactions. Anthropogenic environmental changes threaten human health by causing food and water scarcity, increasing the risks for natural disasters and displacements of populations, and increasing the risks of infectious diseases.

Many factors are contributing to disease emergence, including climate change, globalization and urbanization, and most of these factors are to some extent caused by humans (Lindahl & Grace, 2015). The epidemiological triad of an infectious disease indicates that the three factors necessary for an infectious disease transmission are the host, agent and the environment (Dagleish et al., 2007). It is interesting to know however that man plays a dual role in this transmission process; as a host and as part of the environment.

Man as a component of the environment needs to be managed as well as other environmental factors in the fight to eradicate malaria. In this case, much attention has to be paid to:

- a) his acceptability of the available control measures or tools
- b) his attitude towards other components of the environment and also to the use of available control measures
- c) his knowledge and proper utilization of the available control measures.

Lessons can be drawn from Aikins et. al's (1994) research on attitude of individuals to malaria in five West African countries: People had low knowledge on the cause of malaria; they were more concerned about mosquitoes being a nuisance than a cause of the infection. Infection Was partly attributed to evil spirits and thus treatment involved several traditional approaches. Again, insecticide nets were used for decoration and screening for privacy rather than as a control tool for malaria infection.

A consideration can also be given to the findings of Maduka (2018) when there was discrepancies between net ownership and net utilization (Maduka, 2018) (Maduka, 2018) (Maduka, 2018) (Maduka, 2018) (Maduka, 2018) (Maduka, 2018) (Maduka, 2018) (Maduka, 2018) (Maduka, 2018) (Maduka, 2018). Man should therefore be well oriented and educated so far as malaria control is concerned in order to achieve the desired result.

Kudom & Mensah (2010) noted that though both formal and informal education are necessary in the quest to overcome the menace of malaria, the former presents a better forum for delivery of accurate, adequate and more technical knowledge through school programmes and courses.

The trainee teacher during the observation, internship and the post-internship periods in the various schools in the communities stands in a better position to contribute meaningfully to this fight against the deadly malaria disease. They can initiate or emphasize the discussion on malaria control in the schools and subsequently with parents and other members of the community and encourage a broad dissemination of key information on malaria through the various means of communication available.

Learners can be engaged in interactive sessions to acquire the basic knowledge on malaria thereby becoming key informants and agents of change in their various communities. Trainees can form malaria clubs both at the college and the school levels for awareness creation and community involvement in control and preventive measures. Club members can resort to the use of dramatization, the community information centres and local radio stations to intensify education on malaria and the urgent need to join efforts in its eradication process.

Members can again be engaged in 'pick a can, save a life' activities in which empty cans and containers which serve as breeding grounds for mosquitoes can be collected and buried in the various communities. Other activities such as planned community distillation where choked gutters and other stagnant water would be distilled and house-to-house 'malaria evangelism' would go a long way to sensitize members of the various communities to consciously or unconsciously join in the fight against the 'golbal enemy', malaria.

2. Conclusion

Malaria is a preventable infectious disease claiming thousands of lives globally especially in the sub-Saharan Africa with children under five years and pregnant women being most vulnerable. Proper utilization of recommended control and preventive measures especially by the World Health Organization (WHO) will go a long way to contribute to the effort to eradicate the disease worldwide especially in the sub-Saharan Africa.

Man as a component of the environment with focus on the trainee teacher can be an effective instrument for the control and prevention of malaria in the various communities in the country. Trainees should therefore be given the right orientation that will enable them discharge this duty as a contribution to the fight against malaria. Focus on man as the host and also as a major component of the environment and proper management especially in the area of effective health education to enable him take responsibility for his own health will contribute immensely to the eradication of the disease globally.

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