

Malaria is Often Transmitted in Tropical or Subtropical Areas

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Abstract

Malaria is a parasitic infectious disease caused by a tiny parasite of the genus Plasmodium. Each of these types has its own specificities, either according to the reaction to medications or according to the location in the body after infection, but also according to the effects it has on human health.

Keywords: Malaria, Environment, Transmission, Epidemiology, Health

Introduction

Epidemiology of malaria is the description of what is known almost the conveyance and determinants of malaria [1]. Transmitted to people by the female Anopheles mosquitoes, malaria is respected as the most vital vector-transmitted illness in the world, especially in tropical districts of center- and low-income nations where it causes an evaluated 1 to two million deaths each year.

It is detailed that warm and humid climatic conditions are conducive for malaria transmission, and that the proficiency of the malaria vector will depend on the species of Anopheles and the natural conditions. As such, worldwide climate alter or worldwide warming has been ensnared in epidemic intestinal sickness as more and more jungle fever diseases in already malaria non-endemic ranges such as the highland regions which were secured by their low temperatures, are presently being seen.

Poor socio-economic conditions and need of assets to viably bargain with the challenge are moreover embroiled in the epidemic of malaria, and as such, it is barely astounding that low income nations such as in sub-Saharan Africa are the most extremely influenced, indeed in spite of the fact that excessively so.

Environment

The scale of the malaria issue has expanded in southern Africa due to disintegration in the environment, disasters such as flooding, struggle and the resultant development of individuals in the locale, and as a result of drug-resistant

malaria [1]. It is worth specifying that in non-immune populaces, malaria influences both children and grown-ups similarly, though in regions of steady transmission, children and pregnant women are overwhelmingly influenced coming about in significant mortality, due to the dangerous Plasmodium falciparum species of the malaria parasite.

Some of the current patterns of the the study of disease transmission of malaria highlight that nations such as the United States of America cannot manage not to fortify anticipation and controls against malaria, as it is clear that malaria is starting to happen in ranges that were already thought to be malaria-free. There is no question that climate alter may increment the zones where malaria is at chance of being able to spread inside the United States of America or other nations that may have been pronounced malaria-free.

Studies appear that nations such as the United States of America and parts of Europe still have the mosquitoes that transmit malaria, but the fundamental reason why malaria has not thrived in the United States of America and Europe in the later past is since of financial advancement and superior public health intercessions as restricted to numerous low-income nations which have battled to execute viable and maintainable public health intercessions such as anti-malaria programmes.

However, the most recent accessible prove recommends that in parts of the United States of America, for case, little flare-ups of locally transmitted malaria have happened during unseasonably hot climate conditions. There is developing

body of prove that the unseasonably hot climate conditions may be inferable to worldwide climate alter, especially worldwide warming which appears to have complicated the entire picture in a number of ways, as malaria is presently predominant in lifted locales where it did not already exist.

Travellers to and from malaria endemic zones moreover carry the chance of bringing malaria to already unaffected zones. It is empowering to see that the Centers for Disease Control and Prevention (CDC) gives 24 hour specialized help to health care suppliers to guarantee that there is fast and exact conclusion of malaria for fitting treatment of influenced people and to avoid the encourage spread of malaria in the community. The part played by the CDC is profitable as portion of the anticipation and control of malaria in the United States of America.

The life cycle of malaria is complex, marginally distinctive for each species, and fundamentally includes both people and *Anopheles* mosquitoes [2]. When a human have is chomped by a malaria-infected mosquito, sporozoites are immunized. The sporozoites will travel through the blood and taint liver cells where they will develop into schizonts containing huge numbers of merozoites. In the case of *P. vivax* and *P. ovale*, hypnozoites, a dormant organize, can hold on in the liver and, if not fittingly treated, can cause backslide by discharging merozoites into the circulation system weeks, months, and seldom a long time afterward. The whole prepare of starting replication in the liver is alluded to as exoerythrocytic schizogony. After this prepare is total, schizonts will inevitably burst and discharge merozoites that will enter red blood cells (RBCs). In a prepare known as erythrocytic schizogony, merozoites at first frame little ring stages, at that point bigger trophozoites, and along these lines shape erythrocytic schizonts by means of asexual replication. These schizonts crack, discharging merozoites, which attack other erythrocytes. The cycle of breaking merozoites will inevitably synchronize, flooding the circulation system with parasitic fabric, coming about in numerous of the clinical appearances of disease. For *P. falciparum*, *vivax*, and *ovale*, this happens in a 2-day cycle. In the case of *P. malariae*, the cycle takes after a 3-day course, whereas *P. knowlesi* has a 24-hour cycle. A few of the merozoites will separate into gametocytes (macrogametocytes and microgametocytes), the sexual erythrocytic organize, which can taint mosquitoes.

If an tainted human is chomped by a helpless *Anopheles* mosquito, the microgametocytes and macrogametocytes will be ingested and the sporogonic cycle will start. In the stomach of the mosquito, the microgametes will fertilize the macrogametes and a zygote will be shaped. The motile, prolonged zygote, known as an ookinete, will attack the midgut divider of the mosquito and create into an oocyst. The oocyst will extend and in the long run break discharging sporozoites which will relocate to the salivary organs of the mosquito and be accessible to infect another have. The total cycle in the mosquito takes roughly 10–18 days, a period named the outward brooding cycle or outward cycle. When the tainted mosquito nourishes, sporozoites will be

vaccinated into the human have, and the cycle will start anew.

Place

Place can be characterized in terms of geopolitical units, such as nations or states, or in terms of common geographic highlights, such as mountains or streams [3]. The characteristics of put envelop various perspectives of the environment, counting the physical environment (such as climate, water, and discuss), organic environment (such as vegetation and fauna), and social environment (such as social conventions). For illustration, malaria happens in parts of the world where all these features of the environment are conducive to the life cycle of the *Anopheles* mosquito, the vector that carries illness from one have to another. Physical conditions that are vital for the improvement and survival of the mosquito incorporate a favorable temperature (20°C to 30°C is ideal), satisfactory humidity, direct precipitation, and the nearness of standing or delicately streaming water. Organic components useful to the mosquito incorporate plants that can collect little pools of water. Social variables that empower transmission of the infection incorporate the vicinity of homes to mosquito breeding locales, lodging development that encourages mosquito section, and certain occupations that increment a person's introduction to mosquitos, such as those including open air work at night.

The scale of geographic comparisons can extend from a worldwide scale, in which rates are compared between landmasses and nations; to a territorial scale, in which districts, states, and cities are compared; and to a nearby scale, in which neighborhoods are inspected. In any case of the scale that is utilized, striking geographic designs of irresistible and noninfectious infections are regularly observed.

Cerebral Malaria

Malaria remains a serious public health issue in the tropics, generally in Africa [4]. There exist four *Plasmodium* species that influence people; of these, as it were *Plasmodium falciparum* can sequester in capillaries of the CNS (central nervous system) and cause cerebral malaria. The disease is obtained when the parasite is vaccinated through the skin amid the sting of an tainted *Anopheles* mosquito. A few patients with cerebral malaria display with diffuse cerebral oedema, little hemorrhages and impediment of cerebral vessels by parasitized red cells. The burden of *falciparum* malaria is not as it were since of disease and mortality: the neurocognitive sequelae include signifi cantly to this burden.

P. falciparum is recognized by examination of blood smears with Giemsa recolor. Since parasitaemia is recurrent, rehashed examinations may be required. The CSF (cerebrospinal liquid) is typical in cerebral malaria. Neuroimaging studies may illustrate brain swelling, cerebral infarcts, or little hemorrhages in extreme cases. Artemisinin subsidiaries and quinine are the drugs of choice for cerebral malaria. In spite of treatment, mortality remains tall in extreme or complicated malaria.

Preventive techniques depended upon are: the early treatment of malaria contaminations with successful medications (artemisinin-based combination treatments) to anticipate the movement of the infection to severe malaria; and vector control through diverse means to diminish the rate of contamination (utilize of insecticide-treated nets, bednets, bug spray showers and mosquito coils). All these strategies have been found to be profoundly fetched viable. At display, different considers are beneath way to adjust Plasmodium qualities in arrange to decrease parasite harmfulness and subsequently the horribleness and mortality inferable to malaria.

Transmission

Malaria is essentially transmitted in tropical or subtropical locales by the bite of an tainted female Anopheles mosquito [5]. As the creepy crawlies are night-active, in common, the chomp takes put between nightfall and dawn, particularly interior houses or other sorts of living space. Plasmodia have been found in blood items, but, as plasmodia are touchy to cold, cooling blood items makes them free of disease, they as it were gotten to be essentially infective in the case of a transfusion of untreated new blood. Other conceivable modes of transmission are through the re-use of sullied needles or through the placenta to the unborn child, and, a uncommon circumstance, 'airport malaria' or 'luggage malaria', can be transmitted by the Anopheles mosquitoes being transported interior gear from an endemic locale; in this way, not as it were travelers can be tainted with malaria, but moreover airplane terminal staff or individuals who live in close proximity to airports.

Symptoms

Typical indications among nonimmune people with malaria include fever, chills, myalgias and arthralgias, headache, diarrhea, vomiting, and other nonspecific signs [6]. Splenomegaly, anemia, thrombocytopenia, pulmonary or renal dysfunction, and neurologic findings may moreover be show. When synchronous diseases (happening when a larger part of schizonts crack at the same time) create, each species of Plasmodium causes a characteristic design of periodic fever. The paroxysms of *P. vivax* and *P. ovale* malaria classically happen each 48 hours, whereas those of *P. malariae* happen each 72 hours. *P. falciparum* diseases frequently include a every day or sporadic design of side effects. In any case, this classic introduction with typically repeating fever and chills is profoundly variable and may not be display at all, especially in *P. falciparum* contaminations, early in the course of an sickness, when the quiet is taking solutions that have antipyretic or antimalarial action, or when fractional insusceptibility exists.

Signs and indications of malaria can be incredibly altered by the patient's resistant status; malaria contaminations among somewhat resistant people run from asymptomatic to serious. The showing signs and indications may be atypical or unpretentious, particularly among newborn children and youthful children. The classical introduction of

occasional fever some of the time seen in nonimmune people with synchronous contaminations are as often as possible truant among mostly resistant people. Since the signs of malaria illness can be so nonspecific, it is a common hone in malaria-endemic zones, to treat all febrile illnesses as malaria, particularly in children and pregnant woman, who are at most noteworthy chance for serious or deadly disease.

Diagnosis

Anamnesis plays an important role in the diagnosis of malaria [5]. While a connection between fever and malaria is quickly drawn in malaria-endemic regions, diagnosis is much more difficult in areas where Anopheles mosquitoes are not common. When the cause of fever is unclear, physicians should consider malaria as a possibility, especially if their patients have been travelers in tropical regions. A blood cell count will show that erythrocytes and thrombocytes are reduced. The parasites can be detected microscopically by the so-called thick drop method. The plasmodia species and the number of parasites can be determined. Various malaria rapid tests are available, which provide a result within about 10 minutes. Other means of detection, like fluorescence stain or molecular biologic methods, are possible, but are not used in diagnosis because they are both time-consuming and expensive.

Epidemiology

Malaria should really be regarded as a major global public health priority and that developed countries such as the United States of America should scale up efforts even in the malaria endemic areas of low- and middle-income countries, and rather more so with the complications of climate change, as studies project that the malaria agent, will be able to spread into new areas in the near future [1]. An observation is that malaria has already spread to new areas in low income countries, and this is impacting negatively on equitable public health outcomes as the poor and vulnerable are the most severely affected as they often have poor access to health care services, especially in the rural areas.

Given the magnitude of the malaria issue, it is hardly surprising that the international community has identified malaria as a global public health priority that requires international and multi-sectoral partnerships for intervention. The Rollback Malaria Partnership employs the following tools to control malaria: long-lasting insecticidal nets; indoor residual spraying; intermittent preventive treatment during pregnancy; other vector controls including larvaciding and environmental management; and prompt diagnosis and treatment.

There is no doubt that all the above-mentioned preventive or control measures are crucial, but the challenge today is that the malaria parasite has almost become resistant to all the available antimalarial drugs and has become so resilient to control. Some authors concede that even the discovery of a vaccine will not eradicate malaria, unless there is a clear understanding of the fundamental mechanisms related to

poverty and the dynamism of the determinants of malaria such as human demographics, climate change, environment, land use patterns, drug and vaccine efficiency as they inevitably change over time. It is interesting that South Africa has decided to bring back DDT for indoor residual spraying of walls for malaria control, even though this chemical is banned in many parts of the world.

The epidemiology of malaria is very complex, and the complexity is even more magnified in low-income countries, largely due to multidimensional poverty. Therefore, preventive and control efforts should take this complexity as well as the determinants of malaria into account.

Vaccine

It would be interesting to review what impact the availability of malaria vaccine would have in malaria-endemic low-income countries [1]. The issue of malaria is a cause for concern especially because even though the Global Malaria Action Plan (GMAP) released by the Roll Back Malaria (RBM) Partnership uses key tools to control malaria, each year, there are up to three million deaths due to malaria and close to five billion episodes of clinical illness occur throughout the world, with Africa having more than 90% of this burden.

This suggests that the key tools to control malaria have not been effective. Even if such tools were effective at some stage; they were not sustainable, particularly in the malaria-endemic areas of low-income countries such as in sub-Saharan Africa. Innovations such as the development of an effective malaria vaccine do bring a modicum of hope, especially given the worrisome spread of drug-resistant malaria. Based on the historical success of certain programmes mounted to control and then eradicate certain infectious diseases such as smallpox and polio in many parts of the world, it is anticipated that an effective malaria vaccine would decrease and ultimately eliminate malaria in the malaria-endemic areas.

It is commendable that the World Health Organisation (WHO) together with other partners, have been working together on the Expanded Program on Immunization (EPI) with the goal of universal coverage in the context of primary health care or maternal and child health programs. Further, the Global Alliance for Vaccines and Immunization (GAVI) is working to ensure the earliest possible incorporation of other vaccines into the EPI. As it is believed that the RTS,S malaria vaccine will soon be licenced, models of impact of the malaria vaccine have mainly considered deployment via the WHO's EPI in areas of stable endemic transmission of malaria, and have been calibrated for such settings.

However, looking at the complex situation in many low-income countries; even if an effective malaria vaccine were to be innovated, a malaria vaccine on its own is not going to eliminate malaria if additional efforts to address access barriers, lack of resources, political and socio-cultural implications of malaria and their relationships with multi-

dimensional poverty are not considered.

In that sense, the better way to win the battle against malaria is to improve the economic level of populations living in many countries of malaria-endemic areas together with the synthesis of a good vaccine. Unless additional efforts are directed towards addressing access barriers among the poor and vulnerable, malaria will remain a major cause of morbidity and mortality in sub-Saharan Africa and many regions of Asia where malaria is endemic.

Prevention

While the initiative achieved important successes, including elimination of malaria in some countries and significant reduction in other areas such as India and Sri Lanka, many regions realized negligible progress [2]. Unfortunately, a convergence of factors, including emergence of chloroquine resistance, vector resistance to insecticides, difficulties of sustaining funding, conflicts, and population movements, coupled with inadequate community participation and operational issues, resulted in lost momentum with a subsequent major recrudescence of the disease. The lessons of this key effort must be appreciated and understood if lasting malaria control is to be realized. Ultimately, in areas of significant malaria transmission, integrated and sustained approaches with commitments for adequate funding will be necessary.

The goals of reducing the impact of malaria can range from control, which targets reduction of the impact of malaria, to elimination, an approach that seeks to completely remove the disease from areas, to the lofty notion of total global eradication. There is continuing debate among acknowledged experts on the best antimalaria strategy to pursue and any such Herculean effort benefits from the involvement of both pragmatists and idealists.

The epidemiology of malaria is exceedingly complex, formed by the interaction of agent, vector, host, and environment as well as political and socioeconomic factors. As a result, in most endemic areas malaria control requires knowledge of the local epidemiology and biology. Current control strategies can incorporate a broad array of approaches that include insecticide-treated nets (ITNs), indoor residual spraying (IRS), source reduction that targets mosquito breeding areas, area application of insecticide, intermittent preventive treatment (IPT) of pregnant women, children, and infants, identifying and treating cases, personal protective measures, and education.

Conclusion

The most common cause is the bite of a mosquito, a carrier of parasites that are thus transmitted to a person's body. This parasite survives in female mosquitoes of the genus *Anopheles*. That is why the prevalence of this disease coincides with the prevalence of these mosquitoes, which love a very tropical climate. The parasite reproduces inside the mosquito's body. If an infected mosquito bites, it

transfers the parasite into the human bloodstream with its saliva. Thus, the mosquito is a carrier of infection to humans and/or other mammals. By feeding on infected mammals, healthy mosquitoes introduce parasites into their bodies, so the cycle repeats itself.

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