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Malaria amidst COVID-19 in India: Challenges, Efforts, and Recommendations

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ABSTRACT

Since the outbreak of COVID-19 in India, the country has faced a slew of new challenges, spawning a slew of other deadly viruses and diseases while also serving as a breeding ground for them. Not only did Malaria (a vector-borne disease) emerge as a coincidental outbreak during the pandemic, but many others did as well, causing severe diseases in humans due to flaws in health-care systems that were already overburdened with identifying, preventing, and treating the recently introduced coronavirus disease. Inadequate water cleanliness, as well as the delayed and misdiagnosis of Malaria with COVID-19 due to overlapping symptoms, are major impediments in the incidence of these unique outbreaks. Appropriate steps, such as providing clean water and diagnostic facilities to control Malaria cases, should be adopted to prevent such epidemics in the country.

1. Introduction

Malaria eradication is an international health priority as it has impacted world history more than any other infectious disease by threatening the lives of over half a million people each year, thus making it a major public health concern.¹

Malaria is a parasitic protozoan disease spread by female Anopheles mosquitoes infected with plasmodium species, which is transmitted through an infective bite to humans. Plasmodium falciparum is the parasite with the highest mortality rate on the planet, responsible for a majority of human deaths.² Depending on how early malaria is detected, symptoms and disease outcomes can range from mild to life-threatening. Early detection often prevents life-threatening complications of malaria which include kidney failure, epilepsy, mental confusion, coma, and death.

India has continued its battle against malaria for many years and accounts for the third-highest global malaria burden.³ In 2009 about 1.5 million cases of malaria were reported in the country especially in the urban areas of Orissa, Jharkhand, and Chhattisgarh.⁴ Plasmodium falciparum and vivax have been reported to be the most common among other Plasmodium species causing malaria in humans in India especially in the eastern state of Orissa, whereas Plasmodium Ovale seems to be scarce or non-existent.⁵ For the prevention of vector-borne diseases, the Indian government has developed a number of programs throughout the years including the National Vector Borne Disease Control Programme (NVBDCP) and the National Rural Health Mission (NRHM), which tremendously helped in the eradication of the infection.⁶

Amidst the threat of a novel coronavirus outbreak, malaria programs throughout the country were interrupted and much of the funds and healthcare services were diverted towards the fight against COVID-19. As most of the public health systems were focused on containing and mitigating the viral outbreak, many lethal infectious diseases remained untreated, as a result, their dissemination escalated drastically.^{7,8}

In addition, routine malaria monitoring was also hampered during COVID-19 due to changes in community-based practices of frontline

health care workers. The overlapping symptoms of malaria with COVID-19 further complicated the matter by delaying early diagnosis and treatment and therefore continues to be a major threat to the country.^{9,10}

In the wake of the COVID-19 pandemic, India's government is dealing with the possibility of dangerous fortuitous outbreaks of other communicable diseases, which will most definitely strain the country's already weakened healthcare system.¹¹

2. Challenges

For more than a year, India has been battling COVID-19, despite several setbacks. Still undeterred by the challenges such as decreased funding and lack of qualified clinicians in slum areas, the country's health system has proven to be effective in reducing the disease's growing trends over time.^{10,12} Using the majority of available health tools to combat the latest coronavirus seemed to be the need of the hour. However, there are two sides to any coin, and India, like other countries and regions around the world, such as Brazil,^{13,14} Pakistan,¹⁵ and Africa,¹⁶ faces difficulties in the epidemiological control of infectious diseases and is in danger of seeing its malaria epidemic escalate.

India has seen a significant decline in malaria cases in recent years through the Malaria Elimination efforts which were initiated in the country in the year 2015. They were officially intensified after the launch of the National Framework for Malaria Elimination (NFME) in 2016 and the National Strategic Plan for Malaria Elimination (2017–22). This laid down strategies for the next five years which helped India reduce the number of cases in the country, from about 20 million to around 6 million. Between 2000 and 2019, there has been a 71.8% reduction in malaria infections and a 73.9% drop in mortality. India was the only high-endemic nation to see a decrease of 17.6% in 2019 compared to 2018. Furthermore, in comparison to the same time last year, the overall number of malaria cases recorded in 2020 was 157,284 as compared to the number of cases in 2019 being 286,091, which is a decrease of about 45.02%.¹⁷ A similar trend was also observed in the

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country with respect to the number of cases of dengue which is caused by an arbovirus.¹¹ This raises the question of whether this significant decline in the number of cases in 2020 as compared to 2019, is due to lower vector transmission or due to underreporting, as the Indian public health system was and currently is burdened by COVID-19.

Malaria and COVID-19 share few common symptoms, such as fever, difficulty in breathing, exhaustion, and sudden-onset headaches. As a result, if symptoms alone are used to classify a case without proper testing, a patient with malaria could potentially be misdiagnosed as COVID-19, and vice versa. Malaria symptoms occur 10–15 days after an infective bite; multi-organ failure is typical in extreme cases in adults, and respiratory distress is quite common in children with malaria, mimicking what is often recorded and seen in COVID-19 patients. As a result, health practitioners may face an additional challenge in making the right diagnosis.¹⁸

On the other hand, COVID-19 co-infections are quite common (about 80%) with seasonal respiratory pathogens.¹⁹ Diagnosis of co-infections can be difficult due to overlapping symptoms and travel history which may also be a cause for a significant decline in the number of malaria cases reported by India in the year 2020.²⁰ This further strains the health care system as currently there are no definitive guidelines for the treatment and management of patients with moderate to severe COVID-19 with malaria co-infection.²¹

3. Efforts and recommendations

Strategies to combat malarial infection should therefore be targeted at chemoprophylaxis as well as steps to be taken to stop the spread of parasites from vector to host by nullifying breeding sites of mosquitoes and prevent mosquito bites.²²

First and foremost, it must be borne in mind that pregnant women and children under 5 years of age are unfortunately the most affected by malaria. Adding to the woes, the recent COVID-19 pandemic has brought about lockdowns which have resulted in substantial economical and behavioral changes that continue to impact families' response to malaria. Individuals may hesitate to take their children to hospitals and healthcare centers due to fear of contracting COVID-19, or due to misdiagnosis which may result from a similitude of symptoms. Encouragements and education at the level of the general public, both rural and urban, should be made for early screening of fever as well as other symptoms of malaria. Raising awareness about COVID-19 such as (a) Frequently washing hands (b) wearing facemasks (c) coughing and sneezing on tissue (d) maintaining a minimum distance of 1.5 m (e) use of sanitizer with 60% alcohol among others at the rural level is also necessary, as close to 65% of India's population live in the rural parts of the country.²³

It is also pertinent to note that during the COVID-19 pandemic, the Indian Council of Medical Research, had briefly recommended chemoprophylaxis with Hydroxychloroquine (HCQ) for COVID-19.²⁴ HCQ abuse in India during the first wave of the pandemic could have possibly led to a shortage of the drug, which is widely used for management in malaria, contributing to an increase in morbidity and mortality due to malarial infection. Unjudicial use of HCQ could also risk the development of resistance in patients towards the drug, further affecting the management of malaria during and after the COVID-19 pandemic.

The goal of attaining malaria-free status can possibly be accomplished by emulating the steps followed by China who successfully managed to achieve the same in 4 years, despite the pandemic shaking up their healthcare scenario. India could adopt the successful strategy of a '1-3-7' timeline wherein the deadline to report cases of malaria, confirm cases with predicted spread, and take measures to control the spread is 1, 3, and 7 days, respectively.²⁵

Combating the growing cases of COVID-19 in malaria-endemic countries like India, governments should ensure that frontline staff, healthcare personnel, and vulnerable patients are provided with adequate safety measures. According to the Alliance for Malaria

Prevention's newly released guidelines, it is critical to have life-saving malaria resources such as insecticide-treated nets (ITNs), especially during the monsoon season.²⁶

National malaria control programs (NMCPs) should intensify (a) Vector control with the help of insecticide-treated mosquito nets (ITNs) and indoor residual spraying insecticide (IRS), (b) Effective case management through prompt diagnosis and treatment at local as well as major healthcare centers, and (c) Running campaigns to deliver intermittent chemoprevention to pregnant ladies (IPTp), seasonal malaria chemoprevention in children (SMC) and chemoprevention to infants (IPTi).²⁷

One must also ensure efficacious delivery of indoor bug sprays at individual levels as well as communities to prevent malarial infection. Vigilance among the population residing in areas endemic to malaria to use insect repellent as a preventive measure to reduce mosquito bites must be maintained. Local factories should also be promoted to help produce products that are cheaper but only use ingredients registered with the Environmental Protection Agency to be used on exposed skin. These include repellents that contain N, N-Diethyl-*meta*-toluamide (DEET), picaridin, IR3535, oil of lemon eucalyptus (OLE), *para*-menthane-3,8-diol (PMD), or 2-undecanoate. However, products with OLE or PMD are contraindicated in children under the age of 3 years.¹⁸

4. Conclusion

COVID-19 has become the catalyst for the spread of several potentially lethal diseases around the globe by disrupting the healthcare intervention that was previously dedicated towards them. Healthcare sectors have focused their undivided attention towards battling COVID-19 whilst abandoning its efforts towards former afflictions like malaria. Malaria continues to prove that it is a lethal infection as seen by the number of malaria cases and deaths in India, which could be attributed to the impediments of many malarial management programs, such as seasonal malaria chemoprevention and provision of insecticide-treated bed nets, due to travel restrictions during the lockdown. Despite all the challenges, India has managed to reduce the number of malaria cases as compared to previous years by the meticulous use of governmental strategies laid in the year 2015. However, a thorough assessment of the true burden of the disease will help ascertain if the accentuation in the decline of a number of malaria cases in the year 2020 as compared to 2019 could be due to lower vector transmission as a result of social distancing and lockdowns or due to underreporting amidst the COVID-19 pandemic as similar trends are also seen in other vector-borne infections such as dengue in India.

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Declaration of competing interest

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