

Editorial

Socioeconomic Dimensions of Malaria and India's Policy for its Control and Elimination

Malaria, a disease of antiquity, primarily affects the tropical and subtropical regions of Africa and Asia. In India, it has been a major public health problem for centuries. From an estimated 75 million cases at the time of Independence in 1947, the incidence following the malaria eradication programme was brought down spectacularly to 0.1 million cases and no death by 1965.^{1,2} Thereafter, in spite of economic development, cases of malaria began to increase due to technical and administrative reasons,³ and remained at about 2 million cases around the year 2000.⁴ However, with additional inputs and concentrated efforts, the incidence declined to around 1.3 million cases by 2011.⁴

A meta-analysis by Tusting *et al.* published in the *Lancet*⁵ looked into the role of socioeconomic development in tackling malaria and indicated that the risk of malaria infection was higher, in fact double, among the poorest children than in less poor children. While making a case for socioeconomic development to play a key role in efforts to control malaria, the article recommended that the development programme should be an essential component of malaria control. However, development should not be thought of as a stand-alone strategy, but as a complement to malaria-specific interventions such as indoor residual spraying (IRS), long-lasting insecticidal nets (LLINs), anti-larval and source-reduction methods as a part of integrated vector management (IVM) for vector control and early diagnosis and effective treatment for case detection and its management.

The correlation between malaria risk and poverty has been observed in different countries and within countries in geographical regions inhabited by tribal populations. Malarial regions are not only poor, but economic growths in these areas have been dismal.⁶ Growth of per capita income (1965–90) in countries with high burden of malaria has been 0.4% per year, whereas the average growth for other countries has been 2.3%, i.e. over 5-fold higher.⁶ It has been estimated that a 10% reduction in malaria is associated with 0.3% increase in growth.⁶

Historically, malaria in India is a disease of the poor and most vulnerable sections of society. Being a disease of poverty, malaria occurs primarily among populations living in the proximity of forests and in remote areas close to inter-state and international borders. It imposes great health and socioeconomic burden on those who are already poor and marginalized; the costs are considered enormous when measured in economic terms. Unlike Africa, where malaria affects predominantly children, the malaria burden in India is borne by the economically productive age groups. The emergence and spread of drug-resistant malaria and insecticide resistance is leading to increased health and economic burden.

Severe forms of malaria are more common in states where tribal populations live. In 2011, nearly 90% of *Plasmodium falciparum* (Pf) cases in India were contributed by the states of Orissa, Andhra Pradesh, Chhattisgarh, Jharkhand, Madhya Pradesh and the North East, predominantly from their tribal areas.⁴ For example, Orissa with only 4% of India's population has 13% of malaria deaths and 42% of Pf cases.⁴ In these states, the poor are not only more vulnerable to malaria but they live in tribal and forested areas with limited health infrastructure and have poor access to healthcare. When a bread-winner in the family or the head of household becomes sick with malaria, the family suffers, both in the short term and long term, perpetuating poverty. According to the National Institute of Malaria Research (NIMR), the total disability-adjusted life-years (DALYs) lost because of malaria may be to the tune of 1.9 million years.⁷ Malaria is thus both the cause as well

as the consequence of poverty; at the macro-level, it is a considerable drain on the national economy.

The past decade has seen remarkable economic development particularly in terms of the growth rate of the gross domestic product (GDP) of India,⁸ which was an average 7% even during the period of the global economic meltdown. There was an expectation that with economic development the malaria situation will improve considerably as happened in the USA and Europe. However, there is little evidence to indicate that economic development in terms of GDP on its own has led to substantial reduction in the malaria burden. Moreover, in India, ill-planned and unregulated developmental activities without health impact assessment have caused disturbance in the eco-system and led to conditions conducive to mosquito breeding and increased human–mosquito contact, leading to an upsurge in some vector-borne diseases including malaria especially in the urban parts of India. For example, construction of dams, canals, etc. such as the Upper Krishna project, Rajasthan canal and Narmada canal have contributed to an increase in malaria in the surrounding areas.⁷

However, malaria is entirely preventable and cost-effective interventions are available. A cost–benefit analysis has shown that each rupee invested by the National Malaria Control Programme pays a dividend of ₹19.7.⁷ Yet, malaria continues to remain a major public health problem in India. The trend of malaria cases and deaths showed a consistent decline from 2.1 million in 2001 to 1.1 million in 2012.⁹ Similarly, Pf cases have declined from 1.0 million to 0.5 million cases during the same period.⁹ However, the progress has not been rapid enough, as indicated by a decline in annual parasite incidence (API) from 1.3 in 2007 to 1.1 in 2011 during the 11th Five-Year Plan period.⁴

Against this background, the following key priority initiatives must be implemented without delay for India to control and eliminate malaria in the foreseeable future.

First, substantial and larger additional resources are needed to effectively tackle malaria. At present, the public spending on malaria control in India represents a small proportion of the country's overall expenditure, estimated at about 1.2% of the total government health spending in the same year and about 0.01% of the year's GDP (World Bank Estimates for 2011–12, personal communication). A continuation of support for the malaria control efforts at these levels is unlikely to create a strain on the available fiscal space. There may be scope to increase the funding to a level that will reduce significantly the burden currently being placed on households by their out-of-pocket payments for the diagnosis and treatment of malaria. It is important to underline that malaria requires more resources to enable the national programme directorate (National Vector-borne Diseases Control Programme; NVBDCP) to efficiently control and eventually eliminate malaria from India.

Second, substantial scaling up the coverage of proven and effective interventions, ultimately leading to universal coverage particularly in areas where the incidence is still high will help in reduction of malaria. These include LLIN, insecticide spray and early diagnosis and effective treatment with artemisinin combination therapy. Since transmission depends on vector dynamics and the environmental situation in a local area, interventions must be adapted to the local ecological, epidemiological and socioeconomic conditions.

Third, a strong surveillance system for detecting any new infections in any area (specifically very low incidence areas) followed by a rapid public health response, research support for monitoring drug and insecticide resistance, better use of existing prevention technology and identification of new, cheaper and user-friendly interventions will help in controlling the disease and leading to the goal of pre-elimination status. Adequate planning and carrying out a health impact assessment are critical to ensure that developmental activities do not jeopardize the health of the population.¹⁰ These should be accompanied by mechanisms for tracking progress towards effective control or elimination.

Last but not the least, since malaria is driven by social, economic, cultural, behavioural and environmental determinants, and as most of the risk factors for malaria reside outside of the health sector, it is critical to adopt an intersectoral approach and ensure that health is an integral part of all policies. High-level political support with involvement and effective collaboration between sectors (agriculture, education, immigration, irrigation, etc.) involved, community participation, cross-border collaboration and adequate financial support from the domestic budget as well as international funding sources will be required.¹¹

There is historical evidence that achievement against malaria is often fragile and any kind of complacency may lead to resurgence at any time. Therefore, the inputs not only need to be sustained, but enhanced for sustaining the gains. Further, malaria control is

essential not merely for reduction in morbidity and mortality, but also for the economic development of India. By focusing efforts in high-burden areas and providing universal coverage with proven and cost-effective strategies, we can incentivize the domestic and external funding investment in the health sector and in malaria. However, the effects of development activities must be monitored closely starting with a health impact assessment and through effective governance and accountability.

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