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Can improving access to care help to eliminate malaria?

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Malaria remains a major cause of morbidity and mortality throughout the world, with 32% of the world's population living in areas of risk.[1] Despite the progress that has been made in reducing the burden of malaria through improved access to preventive interventions,[1] there remain many challenges to the eventual eradication of the parasite. Perhaps one of the greatest challenges is the continual battle with resistance, to both the drugs used to treat the cases and the insecticides used to kill the mosquito hosts.[2,3] The former problem is particularly acute in the Greater Mekong region in southeast Asia where resistance to the key drug—artemisinin—is now widespread and partner drugs used in combination therapy are also beginning to fail.[4] In response to this, a global concerted effort has been put in place to interrupt malaria transmission in the Greater Mekong region by 2025.[5]



Alexander Kumar/@globalhealthphotography/MORU

Waiting room of Wang Pha clinic, located on the Thai–Myanmar border run by Shoklo Malaria Research Unit

Although the efficacy of vector control tools in reducing transmission is well established,[6,7] the role of enhanced access to treatment is less well documented. In *The Lancet*, Jordi Landier and colleagues[8] report one of the first systematic studies to assess the combined effect of a scaled up programme of increasing early diagnosis and treatment and targeted mass drug administration in four townships of eastern Myanmar on the incidence of *Plasmodium falciparum* malaria. The programme was provided to all so-called malaria transmission hotspots (villages with >40% malaria of which 20% was *P falciparum*). Between May 1, 2014, and April 30, 2017, incidence of *P falciparum* malaria decreased by between 60% and 98% and incidence of *Plasmodium vivax* malaria decreased by between 52% and 93% across the villages. Before the intervention, hotspot villages had a three-times higher incidence of *P falciparum* at malaria posts than neighbouring villages (adjusted incidence rate ratio [IRR] 2·7, 95% CI 1·8–4·4). Early diagnosis and treatment was associated with a significant decrease in *P falciparum* incidence in hotspots (IRR 0·82, 95% CI 0·76–0·88 per quarter) and in other villages (0·75, 0·73–0·78 per quarter). Notably, the length of time that the village malaria post was established were associated with a decrease in malaria incidence, illustrating the importance of improving access to care in reducing local transmission. As would be expected, mass drug administration further reduced *P falciparum* incidence with an 80% reduction within hotspot villages (IRR 0·19, 95% CI 0·13–0·26). However, by contrast, there was no significant change in the incidence of *P vivax* malaria.

Because of the observational design of the study, there remain several unanswered questions. First, could

similar regional reductions be obtained with enhanced early diagnosis and treatment alone? Improving access to prompt diagnosis and treatment is a core aim of the WHO Global Technical Strategy for malaria.[9] Despite this aim, access remains low in many of the areas with the highest malaria burden.[10] Expansion of care through community-based approaches has been gaining traction for many years,[11] with malaria diagnosis and treatment increasingly provided as part of an integrated community case management strategy for malaria, pneumonia, and diarrhoea. Strengthening existing health systems, which should also remain a priority, is likely to require a multifaceted approach to address issues with access, supply chain management, and quality of care across the public, private, and informal health-care sectors.[12]

Second, the definition of a hotspot and its role in sustaining transmission needs to be clarified. Landier and colleagues[8] defined this on the basis of village prevalence of infection (using ultrasensitive diagnostic tests) compared with others in the same region—ultimately identifying spatial clusters of villages by testing within a 10 km radius of high-prevalence villages. Elsewhere, stratification of malaria interventions is often based on clinic-reported malaria incidence or prevalence of infection from household surveys, or both. However, local hotspots of infection have been shown to be both transient and metric dependent,[13] and in a randomised controlled trial in the highlands of Kenya, targeting hotspots was not efficacious.[14] Further research is therefore required to understand the broader use of this approach and the most appropriate geographical scale for intervention stratification.

Finally, the study targeted malaria hotspots using mass drug administration with treatment rounds given once per month for 3 months. Predictably, through clearing the reservoir of asymptomatic infection, this reduced the prevalence of infection, and additionally resulted in a reduction in malaria incidence in the following year. The effect of any transient intervention such as this can be predicted to decline over time;[15] however, by temporarily reducing malaria incidence, the mass drug administration would have reduced the caseload for staff at the malaria posts, potentially enhancing the effect of early diagnosis and treatment. Undertaking mass drug administration on a large scale can be expensive, and hence its use needs to be compared with not only the health benefits and cost savings that are made through the direct reduction in malaria incidence but also the wider benefits that can be achieved if health-worker capacity is unlocked both in the community and in the broader health-care system. Further research to understanding this balance will help to determine the appropriateness of targeted mass drug administration as a tool to aid malaria elimination.

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