Combining community case management and intermittent preventive treatment for malaria

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Employment of members of the community to treat malaria is a promising approach to the management of this infection in areas where access to treatment is difficult. Intermittent preventive treatment (IPT) of malaria has recently been shown to be a highly effective way of reducing morbidity from malaria in children living in areas of seasonal malaria transmission, and it can be delivered efficiently by community volunteers. Therefore, we suggest that in areas where malaria transmission is seasonal, and IPT an appropriate malaria intervention in children, community volunteers could be employed to deliver IPT during the peak malaria-transmission season and also to provide community case management during this period and during the rest of the year when occasional cases of malaria continue to occur.

Progress in malaria control

Good progress is being made in the control of malaria in many endemic areas as a result of increasing coverage with effective treatment, long-lasting insecticide treated bednets (LLINs) and indoor residual spraying (IRS) [1]. However, progress is not universal and, in many areas of Africa, malaria is still highly prevalent despite improved control efforts, including large scale deployment of LLINs and focal IRS. This is especially the case in areas where transmission has traditionally been very high, with entomological inoculation rates in the hundreds. Although elimination could be an appropriate medium-term goal in some endemic areas [2], achieving effective control of malaria is likely to remain a priority for much of Africa for the next decade, and also ways of achieving this need to be explored. In most epidemiological situations, effective malaria control is likely to require the use of a combination of the limited number of tools in the armoury. However, there is little information about how to use combinations of antimalarial control measures most effectively. In this paper we suggest that combining the delivery of malaria treatment as near to the home as possible, an approach termed home or community case management of malaria, with intermittent preventive treatment of malaria in children (IPTc), could be a novel and highly effective way of achieving a high level of malaria control in areas where malaria transmission is highly seasonal.

Community case (home) management of malaria

Making access to effective treatment easily accessible is the cornerstone of most malaria control programmes. In areas where the majority of the population has ready access to a health centre or to a private pharmacy where effective treatment can be obtained, this is an effective route for delivery of first-line treatment. However, in many areas of Africa, especially in rural areas, the nearest dispensary or pharmacy could be many miles away, discouraging patients from seeking treatment early in the course of their illness. To overcome this problem, innovative ways are needed to bring treatment nearer to the patient, an approach termed community case or home management of malaria (CCMm). In most circumstances, home management refers to the provision of malaria near to the home rather than within it. Volunteers with a limited educational background can be taught to diagnose and treat malaria effectively (Figure 1) [3,4]. In most situations, treatment of malaria by community volunteers is presumptive but they can use rapid diagnostic tests (RDTs) effectively, and thus restrict treatment to parasitologically proven cases [5]. Groups that have been employed to provide CCMm include government employed village health workers, community volunteers and mothers. Community case management has been a WHO-recommended strategy since 2004 and has been adopted by over 30 countries in sub-Saharan Africa.

Common sense suggests that provision of access to effective antimalarial treatment as near to the patient as possible will prevent progression to severe disease and save lives but the evidence that CCMm reduces morbidity and mortality from malaria is limited [6]. A much cited community randomised trial undertaken in Ethiopia showed a 41% reduction in mortality in children under five years of age in communities where mothers were taught to treat febrile children with chloroquine, but special socio-political circumstances could have influenced the outcome of this trial [7]. Two trials of CCMm have been conducted in Burkina Faso. In the first, a before-and-after study,
mothers were taught to administer pre-packaged chloroquine to febrile children. A decline in the proportion of severe malaria cases was noted in the year of the intervention compared with previous years [8]. In a second observational study, it was shown that the likelihood of progression to severe disease was less in children who received prompt treatment in the community than in children who did not [9]. A study in Zaire compared two regions, and found a reduction in the incidence of malaria, but not in mortality, in the region in which community volunteers were taught to administer chloroquine to febrile children [10], as was the case in two earlier studies conducted in Kenya and The Gambia in which no effect on mortality was observed [11,12]. A more recent study conducted in Kampala, Uganda evaluated the impact of CCMm with artemisinin combination therapy (ACT). The prevalence of parasitaemia was reduced in children in the intervention group but there was no reduction in anaemia [13]. The evidence therefore suggests that, although community management of malaria could be effective in reducing morbidity from malaria in some situations, its prophylactic effect is limited.

**Intermittent preventive treatment of malaria**

Intermittent preventive treatment of malaria involves the administration of a full dose of an antimalarial, or antimalarial combination, to a defined at-risk population at fixed time points irrespective of whether or not subjects are known to be infected. This approach to malaria control was tried first in pregnancy (IPTp), using sulphadoxine pyrimethamine (SP) as an alternative to chloroquine chemoprophylaxis. Administration of SP to pregnant women when they present at an antenatal clinic on two or more occasions during pregnancy reduces the incidence of maternal anaemia and low birthweight [14]. Following the success of IPTp, the same principle was applied to infants, another high-risk group, with administration of SP to infants at the time when they attend for routine infant immunisation. Intermittent preventive treatment in infants (IPTi) reduces clinical episodes of malaria by about 30% and reduces hospital admissions [15]. In the case of both pregnant women and infants, a delivery system already exists for the administration of antimalarials, and these methods of malaria control are therefore both highly cost-effective. However, application of these two approaches leaves a large, and increasing, proportion of the at-risk population – older children – unprotected. For this reason, a number of studies have been undertaken recently to determine whether IPT would be an effective intervention in older children and whether it could be delivered through a routine control programme. Areas where transmission of malaria is limited to only a few months of the year, such as the countries of the Sahel and sub-Sahel that cover about half the population of sub-Saharan Africa, are attractive sites for deployment of IPTc because, in these areas, the short period of malaria transmission necessitates only a few rounds of treatment to achieve a high level of malaria control.

Over the past few years several studies of IPTc have been undertaken in Burkina Faso, Ghana, Mali, Senegal and The Gambia [16–22]. These have shown that IPTc with an effective drug combination (SP + amodiaquine has been used most frequently) reduces the incidence of both uncomplicated and severe malaria by as much as 80%. This high level of protection has been seen in children who were already using an LLIN [16,19]. In some studies there has been a reduction in the prevalence of anaemia and in others improved nutrition. Hospital admissions from malaria and hospital admissions overall have been reduced, and a pooled analysis of eight trials showed a substantial reduction in overall child mortality during the malaria transmission season, although the confidence limits on this estimate are wide [23].

IPTc has the potential to prevent much morbidity, and perhaps many deaths from malaria but, unlike IPTp or IPTi, is constrained by the lack of an established delivery system. A number of studies have, therefore, been undertaken to investigate how delivery of IPTc might be achieved through a routine control programme. In Ghana, a comparison was made between delivery by women volunteers in the community and delivery by formal health staff working from fixed clinics. A high level of coverage was achieved, with both methods giving similar results [24]. In The Gambia, delivery by village health workers was compared with delivery by vaccination teams undertaking monthly trekking clinics to rural areas. Village health workers were more effective than the immunisation teams in terms of both the level of coverage achieved and impact on malaria [25]. In this study a high proportion of children received a full treatment course, thus reducing the risk of emergence of drug-resistant parasites. In Senegal it has been shown that community volunteers (relais) can deliver IPTc effectively and they are now being used to do so in a large implementation study involving over 180 000 children who have received approximately 890 000 treatment courses (P. Milligan, personal communication). The fact
that volunteers were paid a modest sum to undertake their work is likely to be one of the factors that has contributed to the success of these volunteer distribution programmes.

**CCMm plus IPTc – a natural combination**

The delivery routes needed for community case management and for IPTc suggest a potential synergy between these two approaches to malaria control that could be exploited in areas of highly seasonal malaria transmission. During the high malaria-transmission season, the community health worker could be given responsibility for treating cases of clinical malaria together with the administration of IPTc to children in the at risk age group. During the rest of the year, he or she would continue to be available to treat any cases of malaria that occur outside the main transmission season and also any other febrile, childhood illnesses. Combining preventive and curative roles within a single person will help to cut the costs of delivery of both interventions and provide a focal point for malaria control within a village.

Three recent studies have investigated whether the same individual can give CCMm and IPTc effectively, but each has significant weaknesses. In an initial study undertaken in Ghana it was found that adding IPTc to case management reduced the incidence of malaria in children, but a weakness of this study was that the diagnosis of malaria was only presumptive and was not supported by microscopy or a rapid diagnostic test [26]. Follow-up of children after a second year of administration of IPTc showed that the parasite prevalence in children aged 6–60 months had fallen to 1% [27]. In a second study undertaken in Ghana, communities were randomised to receive community-based treatment and IPTc with artesunate plus amodiaquine or community case management alone. The incidence of presumptive malaria was reduced in the communities which received IPTc but, as in the previous study, no parasitological diagnosis of malaria was made [28]. No impact on anaemia was observed. Malaria transmission was not highly seasonal in either of these study areas. In an area of The Gambia where malaria transmission is highly seasonal, a large community-based randomised trial was undertaken in which village health workers in one group of villages provided both case management and IPTc during the malaria-transmission season, whereas in the other villages they provided only case management. The study showed that village health workers could successfully combine treatment of malaria, diagnosed with an RDT, with administration of IPTc – but the prevalence of malaria was too low to allow any difference in the incidence of malaria between the two groups of villages to be detected [29].

**Concluding remarks**

The potential for IPTc to reduce morbidity and mortality from malaria in the large areas of Africa where malaria transmission is highly seasonal is substantial, but only if an effective system of delivery can be found. Utilising community health workers to provide both IPTc and community case management is a potentially promising approach to malaria control that needs to be explored further.

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**References**


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