Myanmar Artemisinin Resistance Containment (MARC) survey: malaria awareness and prevention

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Introduction

The shift over the last few years away from failing drugs to the highly effective artemisinin-based combination therapies (ACTs) has been a breakthrough, and it was hoped that the combination of two efficacious drugs with different modes of action would preserve them for many years of use.

However, recent evidence suggests that artemisinin resistant *Plasmodium falciparum* parasites have emerged along the Thai-Cambodian border and it is imperative to mount a vigorous response to stop spread from areas where artemisinin resistance has been identified, while simultaneously undertaking further research to define the nature and geographical extent of the problem.

In a region where resistance to chloroquine, sulfadoxine-pyrimethamine and mefloquine has previously emerged, the declining efficacy of artemisinin would indeed be a catastrophic setback for the progress achieved thus far in the global fight against malaria if it were to spread to Africa. Recent evidence through routine antimalarial drug efficacy monitoring suggests that artemisinin resistance may also be present in Myanmar and therefore an urgent response was needed to determine the extent of resistance, contain it, and prevent its spread across Myanmar and beyond.

Despite recent anecdotal evidence of declining malaria transmission in some parts, Myanmar has the highest burden of malaria morbidity and mortality in the Greater Mekong Sub-region. Myanmar is thus at the forefront in the hopes of containing and ultimately eliminating artemisinin resistant parasites.

The limited data available on malaria in Myanmar poses a tremendous challenge to address this global public health threat. In 2012, a malaria survey of households (hh) was conducted in the areas of known and suspected artemisinin resistance (ie: Tier 1: strong evidence of artemisinin resistance and Tier 2: suspected evidence of artemisinin resistance) to serve as a baseline for the Myanmar Artemisinin Resistance Containment (MARC) efforts.

Methods

The surveys were undertaken in Tier 1 and Tier 2 of the containment area, where there was evidence of delayed response to ACTs or they were at risk of spread of resistant parasites. Survey clusters were defined as 'villages' and selected from malaria risk areas defined as 1a = high risk village, 1b = moderate risk village, 1c = low risk village, 2 = potentially malarious villages, and 3 = non-malarious villages, which includes all of Tier 1 and a subset of Tier 2. The survey areas were located in the southeast part of Myanmar and include Kayah, Kayin, Mon, Tanintharyi and Bago States.

This was a cross sectional household survey using a multi-stage sampling design. The target sample size was 2,000 households in 80 clusters (1,000 in each Tier). A standard and pre tested questionnaire was administered to a respondent in each household. Individual informed consent was sought from all respondents before interviews were conducted.

Data entry for all survey data was done using EpiData 3.1. Double entry was done for all data and appropriate verification and validation carried out. All data was transferred to Stata 12.0 (StataCorp LP, College Station, TX USA) for data processing and analysis. After initial data cleaning and consistency checks, data were re-coded and key indicators generated using pre-defined definitions. All household data analysis was adjusted for the survey design, i.e. clustering, and sample strata and sample weights at the household level and individual level were applied as appropriate.

Results

Figure 1: Household ownership of net of any type (N=1992)

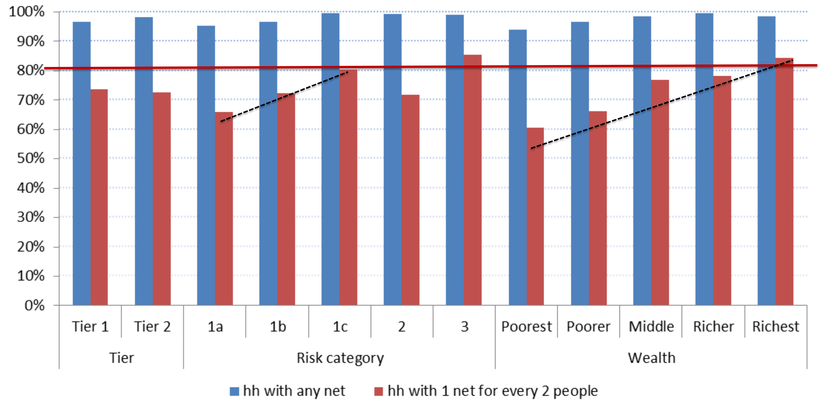


Figure 2: Household ownership of insecticide treated net (N=1992)

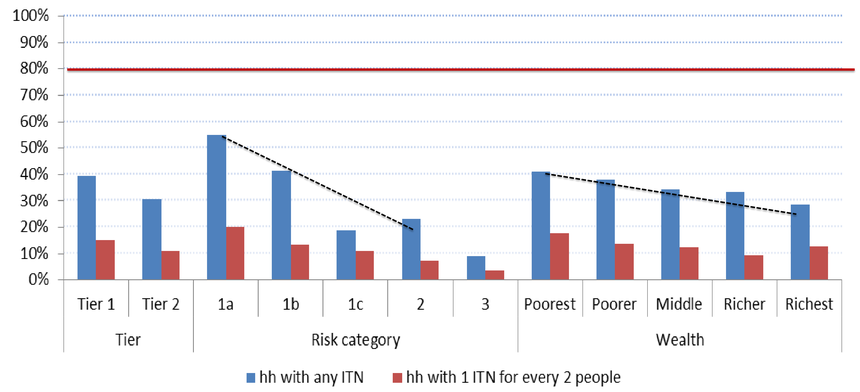


Figure 3: Net and ITN use the night before the survey (N=9408)

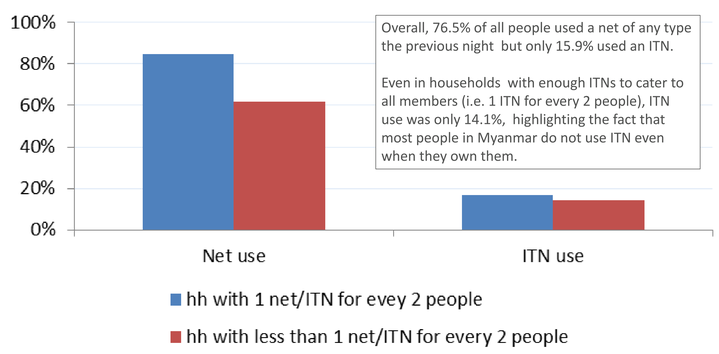
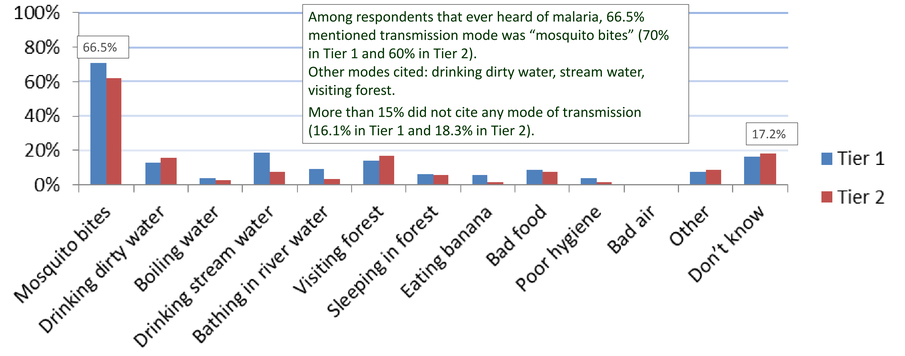


Figure 4: Knowledge of causes of malaria transmission by Tier (N=1898)



Discussion and conclusions

Household ownership of net of any type was high; nearly all households owned at least one net. The proportion of households with universal access (one net for every two people) almost reached the target of 80%. However, ownership of insecticide treated nets (ITNs) was much lower and was insufficient to have an impact on reducing malaria transmission. Less than 15% of households owned sufficient ITN. Ownership of net of any type increased with wealth, suggesting conventional nets are acquired via private retailers, while ITNs are freely distributed targeting households more exposed to malaria. Similarly, more than 80% of all people used a net the previous night, provided enough nets were available. On the other hand, ITN use was very low and was independent of ITN ownership.

This demonstrates that ITN uptake in Myanmar is still very limited and that people would rather use untreated nets as opposed to ITNs. General awareness of malaria was found to be modest with only 66.5% of respondents knowing the cause of malaria.

Considering the high coverage and use of untreated mosquito nets, the national malaria prevention strategy should explore short to medium-term approaches to convert these unconventional nets into ITNs and LLINs. For the longer term, demand-driven strategies should be in place to replace current conventional mosquito nets, building on the existing "net culture" in Myanmar. Further efforts should be placed on improving community perceptions and behaviours for malaria prevention.

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