Malaria in the Yanomami region: response and challenges

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MALARIA CRISIS IN THE YANOMAMI RESERVE

MISSÃO YANOMAMI
JAN/2023

YANOMAMI SOB ATAQUE
GARIMPO ILEGAL NA TERRA INDÍGENA YANOMAMI E PROPOSTAS PARA COMBATÊ-LO
31.007 indígenas
85% são Yanomami
37 polos base
60,7% abaixo de 20 anos
376 comunidades
Distribuição das notificações de malária no DSEI Yanomami

14.833
Malária
2022

Fonte: Sistema de Informações da Atenção à Saúde Indígena (SIASI)
Verbal autopsy

- Reports of deaths probably occurring due to malaria in the territory with lack of diagnosis and healthcare

- Supervised treatment is a need!
  - 3 days for *P. falciparum*
  - 7 days for *P. vivax*
EFFECT OF ILLEGAL MINING ACTIVITIES IN INDIGENOUS POPULATION

Number of tests and cases reported 2000-2022

P. falciparum cases and proportion

In Brazil less than 10% of cases are due to Pf.
Increase in 2023 – effect of improving access to testing

Most diagnosis are by microscopy...

*Dados de 2023 são preliminares, podendo sofrer alterações. Fonte: SIVEP-Malária/SVS/MS.

Diferença percentual e número de casos autóctones de malária em DSEI por espécie parasitária, 2021 a 2023*, jan. a jun.

Most diagnoses are by microscopy...
TRATAMENTO EM MASSA EM ÁREA YANOMAMI

### Distribuição do total de exames de testes diagnósticos para espécie parasitária de malária segundo localidade na Terra Indígena Yanomami, 2023

<table>
<thead>
<tr>
<th>Localidade</th>
<th>Espécie parasitária de Malária</th>
<th>Positividade (%)</th>
<th>Total de Exames Realizados</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Falciparum</td>
<td>Vivax</td>
<td>Mista</td>
</tr>
<tr>
<td>Auaris</td>
<td>95</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Kuratanha</td>
<td>14</td>
<td>3</td>
<td>1</td>
</tr>
<tr>
<td>Hokolassimu</td>
<td>38</td>
<td>12</td>
<td>4</td>
</tr>
<tr>
<td>Olimai</td>
<td>9</td>
<td>3</td>
<td>9</td>
</tr>
<tr>
<td>Onkiola</td>
<td>7</td>
<td>12</td>
<td>9</td>
</tr>
<tr>
<td>Surucucu</td>
<td>39</td>
<td>1</td>
<td>7</td>
</tr>
<tr>
<td>Kataroa</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Waputha</td>
<td>3</td>
<td>1</td>
<td>7</td>
</tr>
<tr>
<td>Watou</td>
<td>39</td>
<td>7</td>
<td>5</td>
</tr>
<tr>
<td>Missão Catrimani</td>
<td>3</td>
<td>11</td>
<td>9</td>
</tr>
<tr>
<td>CASAI Yanomami</td>
<td>3</td>
<td>11</td>
<td>2</td>
</tr>
<tr>
<td>Total</td>
<td>192</td>
<td>239</td>
<td>37</td>
</tr>
</tbody>
</table>

- **80% PT**

### Imagens

- **Realizando TDR**
- **Macerando medicamento para dosagem por via oral em crianças**
- **TDRs positivos para P. falciparum (mãe e quatro filhos)**
- **Medicação separada para tratamento supervisionado**
OVERVIEW OF MALARIA IN YANOMAMI

- Absence of diagnostic and treatment actions in various communities
- Prolonged infection periods
- Gametocytes in > 50% of those infected with *P. falciparum*
- Prevalence of infection
- Variation in TDR positivity from 0 to 60%
- Variation in the proportion of *P. falciparum* from 3 to 80%
- Unregistered deaths
- Inability to establish continuous diagnostic and treatment actions
- Challenging logistics
Proportion of *P. falciparum* malaria burden according to special area
Miners and Originary populations are subjected to similar detrimental situations

- Socieconomic determinants
- Gender imbalance and vulnerability
- Sociocultural aspects
- Political and organizational factors
- Multi-factorial consequences
- Higher rates of nutritional deficiencies
- Low vaccine coverage
- High proportion of co-infections
  - Hepatitis
  - Helminths
  - Viral and parasitic diseases
  - Trachoma
- Violence
Policing and controlling access and mining is ongoing.

Improving access to healthcare and enabling indigenous health workers

Leadership from the DSEI and the communities want malaria eliminated.

There must be a commitment for eliminating and restoring the Yanomami people health dignity.

We have tools to do so and we can do it!
MDA can be used for reducing burden and achieving elimination

4.2.6 Mass drug administration (MDA)

4.2.6.1 MDA for burden reduction

Conditional recommendation for, Low certainty evidence

MDA for burden reduction (2022)

Antimalarial medicine can be given as chemoprevention through mass drug administration (MDA) in areas of moderate to high transmission of P. falciparum to provide short-term reductions in disease burden.

Remark:

- MDA may quickly reduce clinical malaria incidence in settings with moderate to high P. falciparum transmission, but the effect wanes within 1–3 months. Therefore, if MDA is implemented, it should be one of several components of a robust malaria control programme (including good coverage of effective case management and appropriate prevention tools and strategies).
- Malaria programmes should judge the suitability of using MDA in their context based on the desired impact, level of endemicity, and resources required. MDA for burden reduction should be targeted at moderate to high transmission settings, regardless of seasonality (see "Practical info").
- Moderate to high malaria transmission settings are defined as areas with P. falciparum parasite prevalence greater than 10%, or incidence greater than 250 P. falciparum cases per 1000 population per year [29]. These thresholds should not be regarded as absolutes for determining applicability of MDA implementation. It is biologically plausible that MDA in intermediate transmission settings may reduce both disease burden and transmission intensity.
Tafenoquine is available and should be prioritized for indigenous populations!
Prophylaxis for vulnerable groups

Antimalarial chemoprophylaxis for forest goers in southeast Asia: an open-label, individually randomised controlled trial

Tatjana Sprenger, Lorent van der Schans, Sirilake Panpan, Thomas Petz, Irmgard Collary, Nosa Selha, Mari Ei, Deersi Phong
Francisco Maveena, Moneer Muhar, Klangpan Prakong, Piyanuch Fongsin, Moneer Muhar, Klangpan Prakong, Piyanuch Fongsin, Moneer Muhar, Klangpan Prakong, Piyanuch Fongsin

Summary
Background: Malaria in the eastern Greater Mekong sub-region has declined to historic lows. Countries in the Greater Mekong sub-region are accelerating malaria elimination in the context of increasing antimalarial drug resistance.

Effectiveness: The effectiveness of antimalarial chemoprophylaxis for forest goers in southeast Asia was evaluated in an open-label, individually randomised controlled trial.

Methods: 1,511 individuals were screened for eligibility.

Results: 12% of participants were not eligible due to various reasons, including previous malaria infection, history of drug resistance, or other contraindications.

Conclusion: Antimalarial chemoprophylaxis is an effective method for preventing malaria in forest goers in southeast Asia.

Figure 2: Percentage of participants with malaria infection over time. Malaria infection was defined as PCR parasite positivity on days 0 (baseline), 28-35 (month 1), 56-63 (month 2), or 84-91 (month 3), or a case of confirmed clinical malaria during month 1, month 2, or month 3.
New technologies

Safety and Efficacy of a Monoclonal Antibody against Malaria in Mali

Kayentao K et al. DOI: 10.1056/NEJMoa2206966

ReSEARCH SUMMARY

Moderate Headache

<table>
<thead>
<tr>
<th>Percentage of Participants</th>
<th>CIS43LS, 40 mg/kg</th>
<th>CIS43LS, 10 mg/kg</th>
<th>Placebo</th>
</tr>
</thead>
<tbody>
<tr>
<td>11.8</td>
<td>0.9</td>
<td>3.6</td>
<td></td>
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</tbody>
</table>

Relative risk: 3.3, 95% CI, 1.1–9.7

Efficacy against *P. falciparum* Infection

<table>
<thead>
<tr>
<th>Modifier</th>
<th>Placebo</th>
<th>CIS43LS, 10 mg/kg</th>
<th>CIS43LS, 40 mg/kg</th>
</tr>
</thead>
<tbody>
<tr>
<td>Malaria exposure</td>
<td>90%</td>
<td>80%</td>
<td>70%</td>
</tr>
<tr>
<td>Age</td>
<td>80%</td>
<td>70%</td>
<td>60%</td>
</tr>
<tr>
<td>Nutrition</td>
<td>70%</td>
<td>60%</td>
<td>50%</td>
</tr>
<tr>
<td>Coinfections</td>
<td>60%</td>
<td>50%</td>
<td>40%</td>
</tr>
</tbody>
</table>

Breson et al. Sci Transl Med 2022