Factors related to early treatment for malaria in the Brazilian Amazon: a multivariable approach using a ten-year population-based malaria surveillance database

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Outline

• Background
• Study Objective
• Methodology
• Results
• Discussion
• Conclusion
Background

Malaria in the World:

198 million estimated cases of malaria

584 thousand estimated deaths caused by malaria

97 countries with ongoing malaria transmission

Source: World Malaria Report 2014, WHO
Background

- Malaria in the World:

Source: World Malaria Report 2014, WHO
Background

- **Malaria in Brazil:**

  199 thousand estimated cases of malaria
  
  Over 1,865 estimated hospitalizations
  
  40 estimated deaths caused by malaria (2013)

Source: Malaria National Program - DATASUS (2014)
Background

- Present in 9 Brazilian States
- Trend of increasing malaria in the Northwest region. (Amazônia and Acre)
- Many deaths occurred outside of the transmission areas

Background

• Why early treatment is important?

  • Essentially all deaths and hospitalization can be prevented throughout effective health care
  • Early diagnostic and adequate treatment are a way to prevent or reduce severe stage of the disease,
  • It’s an important tool for disease control since it reduces the probability of mosquito bites on infected people
Study Objective

• To investigate factors associated with early treatment for malaria in the Brazilian Amazon

Aim: To provide information to the health care system and to policy-makers in order to identify high risk groups for late treatment
Methodology

• Data sources:
  • SIVEP-Malaria (population-based malaria surveillance database)

• Period of Study:
  • 2004 – 2013

• Approved by the health research ethics board
Methodology

• Inclusion Criteria:
  • States of Acre, Amapá, Amazonas, Pará, Rondônia e Roraima
  • Symptomatic infections

• Exclusion criteria:
  • Imported cases
  • Unknown treatment start date
Methodology

- Statistical Methods:
  - Exploratory data analysis
  - Pearson's correlation matrix
  - Multicollinearity analysis (VIF)
  - Bivariate analysis (model building)
  - Multivariable logistic regression
Important Findings

- Over 3.3 million cases of malaria during the study period
- More frequent among:
  - Males (62%)
  - 40 years-old or younger (82%)
  - Less than 8 years of formal education (82%)
  - Nearly 41% of all cases started treatment within 24 hours of symptoms
Important Findings

- “Brazil is on the right track to achieve a 75% decrease in case incidence by 2015.”

(World Malaria Report 2014, WHO)
## Important Findings

- **Factors associated with early treatment:**

<table>
<thead>
<tr>
<th>Factors Related to Early Treatment</th>
<th>Adjusted Odds Ratios*</th>
<th>P-valor</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Surveillance Type (Ref: passive)</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Active</td>
<td>1.37</td>
<td>1.35</td>
</tr>
<tr>
<td><strong>Years of Formal Education (Ref: 9 or more years)</strong></td>
<td></td>
<td></td>
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<tr>
<td>Illiterate population or less than 4 years</td>
<td>1.20</td>
<td>1.19</td>
</tr>
<tr>
<td><strong>Age Group (Ref: 30-59 years)</strong></td>
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<tr>
<td>0 - 5 years-old</td>
<td>1.39</td>
<td>1.34</td>
</tr>
<tr>
<td>6 - 14 years-old</td>
<td>1.34</td>
<td>1.32</td>
</tr>
<tr>
<td><strong>Notification Period (Ref: 2004)</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2012</td>
<td>1.48</td>
<td>1.42</td>
</tr>
<tr>
<td>2013</td>
<td>1.42</td>
<td>1.35</td>
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<tr>
<td><strong>State (Ref: Pará)</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Acre</td>
<td>1.56</td>
<td>1.55</td>
</tr>
<tr>
<td>Rondônia</td>
<td>1.50</td>
<td>1.49</td>
</tr>
<tr>
<td>Roraima</td>
<td>1.26</td>
<td>1.25</td>
</tr>
</tbody>
</table>

*Adjusted for all factors in the table and for sex, place of work, type of malaria, race and symptoms severity
Discussion

• Active surveillance seems to be an important tool to quickly identify people with malaria and quickly start the treatment.

• “It is known that the most marginalized people have the highest risks associated with malaria. They also have the least access to effective services for prevention, diagnosis and treatment”. (World Malaria Report 2014, WHO)

• As expected, we did find a trend throughout the notification period.
Conclusion

• Early treatment for malaria appears to be associated with active surveillance, early ages, geographical areas and access to public health care facilities.

• In recent years, cases were more likely to start treatment within 24 hours of symptoms onset.

• Inform policy makers and help to enforce the guideline treatment for malaria in Brazil.
References


• Ministry of Health, Department of Information of SUS (DATASUS). TabNet. Available at: http://www.datasus.saude.gov.br/informacoes-de-saude/tabnet

Thank you for listening!

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