THE PATTERN OF MALARIA TREATMENT IN KUALA LIPIS HOSPITAL, PAHANG

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**INTRODUCTION**

- Malaria is one of the *serious diseases caused by parasitic protozoan, plasmodium spp.* that is spread to people through infected Anopheles mosquito.

- Common features and symptoms of malaria are nonspecific and there include fever, fatigue, headache, muscle and joint pain which severe case it *can lead to coma or death.*

- Malaysia is one of the countries with high risk of malaria transmission (*Rahman et al., 1997*)
PROBLEM STATEMENT

- Among Peninsular Malaysia, Pahang had been reported as having the highest cases of malaria since 1985 (Mak et al, 1992).

- In recent years, there are reports of increase in the incidence of malaria cases in Lipis Hospital (Unit Rekod, Lipis Hospital) which cause burden in term of treatment cost to the hospital.

- The studies of malaria are scarce in Pahang state, specifically in Lipis district where malaria is known to exist. Information such as knowledge of the common species of malaria in Lipis area is important for effectiveness treatment of malaria.
Research Questions/ Objectives

General objective:
• To identify the relationship between treatment received for various malaria species and the patients’ clinical outcome

Specific objective:
• To determine the demographic features of malaria cases in Hospital Kuala Lipis, Pahang for past 3 years from 2011 to 2013
• To identify the relationship between treatment received for *plasmodium knowlesi* and the patients’ clinical outcome.
DEFINITION

- Treatment received:
  - artemisinin-based:
    - Artemether plus lumefantrine combination (riamet®) and artesunate are classified as artemisinin-based regime
  - non-artemisinin-based:
    - Combination oral quinine with primaquine or sulfadoxine-pyrimethamine (fansidar®) represent as non-artemisinin-based
LITERATURE REVIEW

- Malaria category:
  - Malaria can be divided into complicated and uncomplicated malaria (WHO, 2010)

- Plasmadium knowlesi:
  - Previously malaria refers to four strains of *plasmodium spp*. Fifth malaria cases caused by *plasmodium knowlesi* is being recognized more and more commonly in Southeast Asia including Malaysia. (Singh B et al, 2004)

  - There is limited information on treatment guideline for *p.knowlesi* (Timothy W et al, 2011)

  - Most of uncomplicated *p.knowlesi* cases responded well towards choloquine plus primaquine (Daneshvar et al, 2009)
LITERATURE REVIEW

- Treatment option for various malaria species:

  - Rajahram *et al* (2012) had highlighted the issue of standardising the treatment for severe malaria regardless of the species due to the complications including death.

  - SEQUAMAT study had also suggested that parenteral artesunate is preferred over quinine for patients with severe *P. falciparum* malaria. (Prof M Abul Faiz *et al.*, 2005)

  - Artemisinin-based combination therapy such as artemether and lumefantrine (riamet®) was the treatment of choice for uncomplicated *P. falciparum* malaria and *P. vivax* (Barber *et al.*, 2013).

  - *P. ovale* and *P. malariae* malaria can be treated adequately with chloroquine since there was rarely resistance towards chloroquine (non artemisinin based) (WHO, 2010).
RESEARCH METHOD

- Study design
  - cross sectional, retrospective study.

- Study Period
  - Jan 2011 to December 2013.

- Study area
  - Hospital Lipis
Study population

- *Inclusion criteria:*
  - Patients aged 13 years and above with malaria cases
- *Exclusion criteria:*
  - Patients were discharge at their own risk
  - Pregnant or lactating mother
  - Patient with known allergy to any of the anti-malarial medications.

Sampling

- Non random purposive sampling based on the name list recorded in ‘Unit Rekod’ Hospital Lipis
**Research Method**

- **Data Collection**
  - Patient case note from ‘Unit Rekod’ Hospital Kuala Lipis.
  - The indicator used to determine the clinical outcomes of malaria patient
    - Time taken to achieve afebrile (days)
    - Length of hospital stay (days)
    - Time to achieve BFMP clearance (days)

- Effectiveness of different type of treatment was measured by classifying the patients into two groups depending on the treatment received:
  - artemisinin-based therapy
  - non-artemisinin-based therapy
RESEARCH METHOD

Data Analysis

- statistical package for social sciences (SPSS) program version 19 and Microsoft excel.

- **Kruskal Wallis test** was used to test for an association between various *malaria* species against the study variable which are time to achieve afebrile, BFMP clearance and length of hospital stay (clinical outcome).

- **Independent t-tests** were used to observe the association between artemisinin based therapies against non- artemisinin based therapy for uncomplicated *plamodium knowlesi*.

- A p-value of <0.05 was defined as significant association between the dependent and independent variables.
# Findings

## Patients Demographic Data

<table>
<thead>
<tr>
<th>Variable</th>
<th>Number (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gender</td>
<td></td>
</tr>
<tr>
<td>Male</td>
<td>102</td>
</tr>
<tr>
<td>Female</td>
<td>24</td>
</tr>
<tr>
<td>Locality</td>
<td></td>
</tr>
<tr>
<td>Felda</td>
<td>20</td>
</tr>
<tr>
<td>Rural area</td>
<td>96</td>
</tr>
<tr>
<td>Urban area</td>
<td>10</td>
</tr>
</tbody>
</table>
**Findings/ Result**

Trend of Malaria Cases from 2011 to 2013 in Kuala Lipis Hospital

- **Plasmodium falciparum**
- **Plasmodium malariae**
- **Plasmodium knowlesi**
- **Plasmodium vivax**
- **TOTAL**
**FINDINGS/ RESULT**

- Treatment option among all species of malaria in Kuala Lipis Hospital

![Bar Chart]

- **Species of Malaria**
  - p.vivax
  - p.malariae
  - p.falciparum
  - p.knowlesi

- **Number of Patient**
  - Bar graph showing distribution between artemisinin base and non artemisinin base.
Table: Association between mean time to achieve afebrile, time to achieve BFMP clearance and length of hospital stay with type of treatment in all species

<table>
<thead>
<tr>
<th>Type of treatment</th>
<th>P-value&lt;sup&gt;a&lt;/sup&gt;</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Artemisinin bases (N=16)</strong></td>
<td><strong>Non artemisinin bases (N=88)</strong></td>
</tr>
<tr>
<td>Mean time to achieve afebrile (days)</td>
<td>3.13 ± 0.957</td>
</tr>
<tr>
<td>Mean time to achieve BFMP clearance (days)</td>
<td>4.06 ± 1.181</td>
</tr>
<tr>
<td>Mean length of hospital stay (days)</td>
<td>5.94 ± 1.289</td>
</tr>
</tbody>
</table>

<sup>a</sup> independent t-test
**Findings/ Result**

Table: Association between mean time to achieve afebrile, time to achieve BFMP clearance and length of hospital stay with type of treatment for *Plasmodium knowlesi*

<table>
<thead>
<tr>
<th>Type of treatment</th>
<th>P-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>artemisinin base (N=15)</td>
<td></td>
</tr>
<tr>
<td>mean time to achieve afebrile (days)</td>
<td>3.13 ± 0.957</td>
</tr>
<tr>
<td>mean time to achieve BFMP clearance (days)</td>
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</tr>
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<td>mean length of hospital stay(days)</td>
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</tr>
</tbody>
</table>
**DISCUSSION**

- Demographic data:
  - Majority malaria infected patients (76.2%) were come from rural area. This could be explained by the geographical that rural area was near to the forest and felda was involving in plantation of rubber or palm oil.

  - A study done by Barber and his colleague found that almost all malarial infected patients were reported forest or plantation exposure. (Barber et al., 2013).
Discussion

- Demographic data:
  - Male was the main contributor for the malaria cases in Kuala Lipis Hospital. This may be due to the occupation of the patients. Majority of the infected male patients were working in plantation such as rubber tapper or palm oil collector. There was higher chance for them to expose to the vector (mosquitoes).
DISCUSSION

- **Species of malaria:**
  - In West Malaysia the vectors for *P. knowlesi* have been identified as An. hackeri in Selangor and An. cracens in Kuala Lipis, Pahang. (Singh & Daneshvar, 2010)
  - Both of these mosquito species prefer to feed on monkeys rather than humans, which may explain the *plasmodium knowlesi* was one of the highest number of infected malaria species in Hospital Kuala Lipis. (Singh & Daneshvar, 2010)
DISCUSSION

Treatment option:

- The prescribing pattern of antimalarial in Kuala Lipis Hospital was the combination of more than 1 antimalarial agent. This strategy was to prevent the resistance of single antimalarial drug and to be more efficient to kill parasite in the blood stream.

- Before 2013, chloroquine was the core antimalarial in the treatment of all kind of malaria species.

- After national drug surveillance on antimalarial was carried out in whole Malaysia, only riamet or artequine was prescribed to patient with the species of falciparum, malariae and knowlesi. (uncomplicated cases)

- Since then, the spectrum of antimalarial agents used in Kuala Lipis Hospital has changed. Chloroquine only reserved for Plasmodium vivax. For complicated malaria, IV artesunate was using to treat all kind of malaria regardless of species.
DISCUSSION

- Clinical outcome vs different types of treatment regime in all malaria species:
  - From previous studies concluded that artemisinin base drug was more effective compare to chloroquine (non artemisinin) and antifolate agent (Luxemburger, Nosten, Raimond, Chongsuphajaisiddhi, & White, 1995)
  - We compared artemisinin base and non artemisinin base in uncomplicated malaria and we found that there was no statistical significant different between these 2 groups in patients’ clinical outcome.
DISCUSSION

- Effect on different type of treatment in Plasmodium knowlesi:

- Chloroquine was shown to be effective for uncomplicated knowlesi malaria in Kapit (Daneshvar et.al, 2010),

- The retrospective study at QEH found faster parasite clearance with oral artemisininin combination therapy (ACT), artemether-lumefantrine (William et.al, 2011)

- In the study, we compared the use of chloroquine and riamet and we could conclude that 2 groups of treatment were equally effective in treatment of uncomplicated plasmodium knowlesi.
LIMITATIONS

- Case note for malaria cases from record storage unit Kuala Lipis Hospital were used as one of the source of data throughout the study. In few, case note records were not properly filled, therefore the information obtained was incomplete and no follow up could be done on all the malaria cases.
CONCLUSION

- The main malaria species isolated from the patients were *plasmodium malariae* and *plasmodium knowlesi*.

- All malaria cases regardless of species were treated with more than 2 antimalarial agent to prevent resistance of single antimalarial agent.

- Use of artemisinin derivative in management of non-complicated malaria did not show superior effect in all clinical parameter. Frequently, exert drug pressure in certain drug will promote the résistance of that agent.
REFERENCE


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