Development and Validation of a questionnaire to assess attitude to bite avoidance measure amongst travellers to malaria endemic areas

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BACKGROUND

Bite avoidance measures against mosquitoes are an important element of protection for travellers against malaria and other mosquito born diseases. Although it is recognised that adherence to such measures can be poor, there have been few studies that have examined the reasons for advice on bite avoidance not being followed by travellers when visiting malaria endemic areas. We describe the validation of a questionnaire to explore traveller’s opinions of bite avoidance measures and present the results of two pilot studies.

THE DEVELOPMENT AND VALIDATION PROCESS

The factors that might influence traveller’s perceptions of bite avoidance measures were identified from the literature. These were categorised under two broad headings; repellents applied to the skin, clothing/clothing treatment, and measures taken on retiring.

To ensure that the questionnaire contained questions representative of the areas of interest, and therefore has content validity, in-depth interviews with the following categories of people were conducted:

- Those who had previously travelled to malaria endemic areas
- Individual’s planning to travel to malaria endemic areas for the first time
- Those who had no experience or were not planning to travel to malaria endemic areas

From the themes that emerged from the interviews, a questionnaire was constructed using closed question and Likert type scales. Face validity was examined through review of the questionnaire by practitioners (a nurse, pharmacist and physician) in travel medicine.

Reliability was assessed by the test re-test method in which the questionnaire was administered to 6 individuals and then re-administered two weeks later. The percentage agreement ranged from 70-100% for each question except relating to clothing insecticide treatment where it was lower at 50-80%. In all cases the difference was but one point on the 5-point Likert scale and mostly relating to “agree”/“strongly agree” options. Therefore the valence of the responses remained mainly the
same, i.e., there were few occasions where these individuals changed from “agree” to “disagree” response over the two-week period. Reliability was further investigated through pilot studies.

THE PILOT STUDIES

Three pilot studies were conducted:

**Pilot study 1:** The questionnaire was administered by a researcher to 30 travellers planning a trip to a malaria endemic area who visited a specialist travel store and medical centre in London, UK.

**Pilot study 2:** The questionnaire was given to 31 travellers planning a trip to a malaria endemic area who visited a specialist travel store and medical centre in Bristol, UK. In this study the participants completed the questionnaire in their own time and returned the questionnaire by post to a researcher.

RESULTS

Few significant differences were observed in the responses for pilot study 1 and 2. Some of the results are presented to highlight the main negative perceptions regarding bite avoidance measures.

**Figure 1** shows the bite avoidance measures that participants intended to take on the planned trip, combined from pilot 1 and 2. In high risk areas such as SS Africa more than 20% of travellers did not plan to use repellents and 40% not to use any measures on retiring. **Figure 2** describes some of the main negative perceptions regarding bite avoidance measures.

![Fig. 1 Intended Bite Avoidance measures](image-url)
**Fig 2. Percentage of participants who agreed/strongly agree with some statements on bite avoidance measures**

<table>
<thead>
<tr>
<th>Statement</th>
<th>% Study 1 (N=30)</th>
<th>% Study 2 (N=31)</th>
<th>% Total (N=61)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Using repellents is time consuming</td>
<td>20</td>
<td>21</td>
<td>21</td>
</tr>
<tr>
<td>Repellents are Cosmetically unacceptable</td>
<td>26</td>
<td>25</td>
<td>26</td>
</tr>
<tr>
<td>Repellents are Expensive</td>
<td>63</td>
<td>82</td>
<td>60 *</td>
</tr>
<tr>
<td>Repellents can be toxic/bad for the skin</td>
<td>43</td>
<td>60</td>
<td>52</td>
</tr>
<tr>
<td>Long sleeves / trousers are too hot to wear</td>
<td>63</td>
<td>67</td>
<td>65</td>
</tr>
<tr>
<td>Nets too stuffy to sleep under</td>
<td>17</td>
<td>27</td>
<td>21</td>
</tr>
<tr>
<td>Nets too troublesome</td>
<td>27</td>
<td>23</td>
<td>25</td>
</tr>
<tr>
<td>I don’t like the smell of insecticide sprays</td>
<td>43</td>
<td>37</td>
<td>40</td>
</tr>
</tbody>
</table>

* Chi-Square = 10.770, DF = 2, P-Value = 0.005

**CONCLUSION**

The questionnaire should be assessed in larger studies for potential use as a tool for assessing perceptions of bite avoidance measures for those visiting malaria endemic areas. Some of the main negative perceptions were identified by the questionnaire.
# Bite Avoidance Survey BTHA

## 2. About you and your trip

1. What is your gender
   - [x] male
   - [ ] female

2. What is your age in years
   - [ ] 18-30
   - [ ] 31-40
   - [ ] 41-50
   - [ ] 51-60
   - [ ] older than 60

3. How much advice did you receive before your trip regarding methods to avoid mosquito bites
   - [ ] a lot
   - [ ] some
   - [ ] none at all

4. Name all of the countries that you travelled to on your recent trip overseas
   - 

5. For how long were you away
   - [ ] less than 1 month
   - [ ] 1-3 months
   - [ ] more than 3 months

6. Have you travelled before this trip to an area where there is a risk of malaria
   - [ ] Yes
   - [ ] No

7. What was the purpose of your recent travel
   - [ ] Visiting family and friends
   - [ ] Business
   - [ ] A package or other type of holiday staying at a single destination
   - [ ] Basiqa/feeling or trekking
   - [ ] Other (please specify)
     - 

### 3. mosquito bite avoidance measures

This section will ask about the various methods you may have used to avoid mosquito bites.

**1. Please describe your use of bite avoidance measures**

- **Choices - frequently, sometimes never**

<table>
<thead>
<tr>
<th>Method</th>
<th>Click on your choice</th>
</tr>
</thead>
<tbody>
<tr>
<td>Did you stay in an air-conditioned room</td>
<td></td>
</tr>
<tr>
<td>Did you use a mosquito net at night</td>
<td></td>
</tr>
<tr>
<td>Did you wear clothing to cover arms when going out after dusk</td>
<td></td>
</tr>
<tr>
<td>Wear trousers when going out after dusk</td>
<td></td>
</tr>
<tr>
<td>Used an insect repellent on the skin while out after dusk</td>
<td></td>
</tr>
<tr>
<td>Used an insecticide spray in your room</td>
<td></td>
</tr>
<tr>
<td>Used a plug-in insecticide vapouriser</td>
<td></td>
</tr>
</tbody>
</table>

If you used a repellent please give the brand and strength of all repellents used

2. If you used any other methods to avoid mosquito bites please describe

3. Did you get bitten by mosquitoes whilst away

   - Many bites
   - A few bites
   - No bites

4. If you were bitten did you tend to take more measures to avoid bites

   - Yes
   - No

5. Did you take medication to prevent malaria whilst you were away

   - Yes
   - No
Bite Avoidance Survey BTHA

4. Your opinions

In this final section you will be asked your opinion of the various methods used to avoid mosquito bites.

1. Your opinion of Mosquito Nets. Select whether you agree or disagree by clicking on the menu.

<table>
<thead>
<tr>
<th>Choices for this section are</th>
<th>Select from the menu</th>
</tr>
</thead>
<tbody>
<tr>
<td>Strongly Agree</td>
<td></td>
</tr>
<tr>
<td>Agree</td>
<td></td>
</tr>
<tr>
<td>neither agree or disagree</td>
<td></td>
</tr>
<tr>
<td>Disagree</td>
<td></td>
</tr>
<tr>
<td>Strongly Disagree</td>
<td></td>
</tr>
</tbody>
</table>

   - Using mosquito nets can reduce the risk of malaria.
   - Nets are too stuffy to sleep under.
   - Nets are too troublesome.

2. Your opinion of insect repellents. Select whether you agree or disagree by clicking on the menu.

   - Using repellents can reduce the risk of malaria.
   - Repellents are effective in preventing mosquito bites.
   - I don’t need repellents if I am taking malaria tablets.
   - Repellents are unpleasant to use.
   - Repellents are toxic or bad for the skin.

3. Your opinion of clothing to prevent mosquito bites. Select whether you agree or disagree by clicking on the menu.

   - Wearing long sleeves and trousers when outside at night reduces the risk of catching malaria.
   - Using insecticide sprays on clothes reduces mosquito bites.
   - Treating clothes with insecticide spray takes too much time.
   - Insecticide sprays applied to clothes can damage them.
   - Wearing long sleeves and trousers is too uncomfortable if it is hot outside at night.

4. Your opinion of other methods of avoiding mosquitoes after retiring. Select whether you agree or disagree by clicking on the menu.

   - Keeping windows closed reduces mosquito bites.
   - Sleeping in an air conditioned room results in less mosquito bites.
   - Spraying the room with insecticide is a bad method of reducing insect bites.
   - Plug in insecticide vaporizers are a good way of avoiding mosquito bites.

5. Your opinion of malaria. Select whether you agree or disagree by clicking on the menu.

   - Malaria is a severe condition.
   - Malaria is easily treated.
   - Malaria is not as common in travellers from the UK.
   - Avoiding mosquito bites reduces the risk of malaria.