Author's response to reviews

Title: Household antimicrobial self-medication: A systematic review of the burden, risk factors and outcomes in Low and Middle Income Countries

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Response to the editor and reviewers of article MS: 1527361957167833

‘Household antimicrobial self-medication: A systematic review of the burden, risk factors and outcomes in Low and Middle Income Countries’

Editors’ comments

1. Clarify how scores were allocated using the adapted ‘bias of risk’ assessment tool e.g did you allocate a score of 1 for each criteria present?

Response

The score of 1 (Moderate/high or unclear) or 0 (low) was allocated for each criteria assessed in the reviewed article. The final scores were then manually computed into three levels of bias with 0-2 (low risk), 3-4 (moderate risk) and 5-8 (high risk)……………………………………..Page 4, paragraph 2 sentence 5 and 6

2. The findings from the meta-analysis need to be clearly signposted in the main text (results narrative relating to prevalence), I am guessing that Table 3 presents these pooled meta-analysis results (Make this clear in the title of the table).

Response

The title of Table 3 has been adjusted to reflect the pooled meta-analysis results

‘Pooled results of the prevalence of self-medication by region, antibiotic used and condition treated’………………………………………………………………………………………………..Page 24

3. The asterisk indicating I-square of >90% is meaningless as it isn’t clear whether this relates to all included studies-if yes, then just state this in the narrative.

Response

The I-square >90% represents the outcome of the meta-analysis of each category and the corresponding values have been indicated in Table 3.

4. For the category ‘Medicine used’ I-squared results for each sub-category should be presented separately as they relate to different out-come measures.

Response

This has been adjusted accordingly (Table 3)……………………………………………………Page 24
5. There are some formatting corrections needed as well as there is inconsistent use of the % symbol in Table 3
Response

This has been adjusted accordingly

Reviewer 1 comments

1. What new has the review added to the already known facts?
Response:............................................................................................................................................................................Page 17

This being a review study we were able to synthesize the following main findings from published studies on antimicrobial self-medication in LMICs:

a) Community drug sellers often do not have adequate biomedical knowledge of the antimicrobial agents and the disease processes. However they are commonly used as source of advice or information for the antimicrobial agents obtained and used over-the-counter.

b) Settings in which individuals are highly educated tend to have relatively low levels of use of antimicrobial self-medication. Therefore promotion of literacy among communities is an important target to minimize antimicrobial self-medication in LMICs.

c) Due to their prior successful use of antimicrobial agents, individuals in most communities tend to believe that they are able to manage subsequent illness without consulting a physician. This is a potential risk factor for inappropriate drug use since most patients lack knowledge of the disease process and the medicines used in self-medication.

d) In the review, adverse effects of antimicrobial self-medication were rarely reported in the articles from most studies in LMICs.

2. Some outdated references have been used (6, 8, 14, 56, 60, 62, 63, 66, 69, 74), when the period of the review has been selected as 2002-2012, which may be removed
Response............................................................................................................................................................................Pages 2-20

Yes the references noted are quite old and have been removed or updated accordingly
a) Reference 6 (Russell, 1990) has been removed from the document
b) Reference 8 (Bradely, 1995) has been updated using Mehta et al., 2007
c) Reference 14 (Pan, 1999) has been replaced using Radyowijati et al., 2003
d) Reference 56 (Herxheimer, 1999) has been deleted
e) Reference 60 (Blenkinsopp, 1996) has been replaced by Radyowijati et al., 2003
f) Reference 62 (Shakoor, 1997) has been deleted
g) Reference 63 (Dua, 1994) has been deleted from the document
h) Reference 66 (Duong, 1997) has been deleted from the document
i) Reference 69 (Etkin, 1990) has been replaced Radyowijati et al., 2003
j) Reference 74 (Wolffers, 1987) has been replaced by Bennadi, 2010

3. Random checking of Table 1 shows some incorrect data. For ex study by Agbor (2011) actually gives a prevalence of self-medication as 67.8%, while it is reported in the review as 27.4%; prevalence of SM by Jassim (2010) is also wrongly written.

Response:

Yes the two studies reported on general prevalence of self-medication in the communities as 67.8% (Agbor, 2010) and 78% (Jassim, 2011). However our review focused specifically on antimicrobial self-medication which was reported as 21.2%, 63.5% by Agbor, 2010 and Jassim, 2011 respectively………………………………………………………………..Page 21 and 22

4. Only abstract is available for some studies on which the review is made, full text could not be retrieved eg ref 38, 39 etc

Response:

a) Reference 38; Abdo-Rabbo, 2003; Eastern Mediterranean Health Journal 9(4):600-606. The full text of this article is available and is attached as an appendix in this document

b) Reference 39; Agbor, 2011; Int Dent J 61:204-209. The full text of this article is available and is attached as an appendix in this document
5. Could not retrieve even abstract of studies reference no 14, 41, 43

Response:

a) Reference 14: Pan American Health Organization, 1999; this was not an article included in this review as was referred to only in the background to this review. However this reference has been removed from the manuscript as guided by the reviewer 1

b) Reference 41: de Oliveira, 2004; this study was included in the review; the full text is available and is attached as an appendix to this document.

c) Reference 43: Jombo, 2011; this study was included in the review; the full text of this is available and is attached as an appendix to this document

6. Title of paper written wrongly for ref 6:

Response:
The title of reference 6; Russell (1990) was written as ‘Self-medication by two men attending a genitourinary medicine clinic’. However the articles’ reference should have been ‘Russell JM, Barton SE, Lawrence AG. Self-medication by women attending a genitourinary medicine clinic. Int J STD AIDS. 1990 1(4):279–281’. However this reference has been removed from the manuscript as guided by the reviewer 1

7. Website reference not mentioned for many papers eg 10, 16

Response:
Reference 10: WHO, 2009; the website for this reference has been provided; www.apps.who.int/medicinedocs/documents/s16168e.pdf

Accessed on 22 June 2015

Reference 16: Holloway 2009; this is the same as reference 10 above and has been updated accordingly as stated above.

8. Several authors are missing in articles e.g 38, 39, 42, 56

Response ………………………………………………………………………………………………….Pages 18, 19

a) Reference 38: This article was written by only one author and is listed in the reference list
b) Reference 39: There are only two authors of this article and are all listed in the reference list

c) Reference 42: There is only one author of this article and is listed in the reference list

d) Reference 56: This article has been deleted from this document as guided by the reviewer as it is an old study

9. Studies on Brazil (2), Argentina and Greece are reported (Upper middle or Higher economies according to world bank) while the study title aims to discuss outcomes in LMICs

Response:

We did not include any study from Greece as it’s listed as a high income country according to the World Bank. Brazil and Argentina however are upper middle income countries according to the World Bank and therefore met the inclusion criteria set for the current review (Low and Middle income countries).

Reviewer 2 comments

1. In some places, reference is made to a number when the sentence states study by (5)….This is an example from the introduction. It will be useful to give the authors’ name in the sentence

Response:

We did follow the referencing format of BMC Public Health as outline in the author guidelines however the sentence constructions have been adjusted accordingly. The sentence now reads …., a study by Yousef et al., (2008) [5] reported self-medication……………

2. I feel it will be useful to provide some specifics while describing the main determinants, for example it says level of education and gender, severity of illness etc, it will be useful to say which categories within these factors are associated with a higher use

Response:……………………………………………………………………………………….Page 25, Table 4

Some of the main determinants of antimicrobial self-medication as reported by the primary studies in LMICs include ‘low level of education’, ‘female gender’ and ‘mild-to-moderate severity of illnesses. This has been adjusted in the review.
Malaria self medications and choices of drugs for its treatment among residents of a malaria endemic community in West Africa

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ABSTRACT

Objective: To assess people’s knowledge about malaria treatment which is one of the main components of the roll back malaria (RBM) programme instituted on the African Continent with the aim of bringing the disease under control. Methods: The cross-sectional study was carried out between October and December 2009, involving 3 171 adult women who were selected from households using systematic sampling methods. Quantitative information such as age, educational level, marital status, occupation, number of children and knowledge of malaria were obtained using structured and semi-structured questionnaires, while qualitative information was obtained using focussed and in-depth group discussions to complement quantitative data. Results: The modes of approach to malaria treatment were 41.1% (1 302), 36.0% (1 143), 10.7% (339) and 0.5% (15) would attend hospital/clinic, buy drugs from pharmacy/chemist shop, take traditional herbs, and take no action respectively. Factors that were found to increase the level of knowledge about antimalarial drugs among the respondents were increasing educational level, being married compared to singles, having children and increasing family income (P < 0.05), while occupation and age differences had no contributory factors (P > 0.05). Knowledge about artemisinin combined therapy (ACT) was less than 15% similar with intermittent preventive treatment (IPT); home-based management for malaria (HBMM) was not in place. Conclusions: The drug component of the RBM programme in the community should be reviewed and appropriate amends instituted in order to ensure efficiency of the overall malaria control programme in the community.

1. Introduction

Malaria fever in this new millennium is still a global disease of serious public health importance[1–3]. The disease presently accounts for over a yearly 100 million deaths worldwide; at least one death every 45 seconds, most of which (over 70%) occurring in sub–saharan Africa’s primarily pregnant women and children[4–6]. Globally still, the disease accounts for much higher morbidities and mortalities than that caused by tuberculosis, HIV/AIDS and enteric fevers put together with still documented weak control methods among most communities endemic for the disease[7–9].

Anthropologists, paleontologists, archeologists as well as medical historians generally believe that malaria could have existed quite long ago in the course of human existence[10–12]. Various herbs from ancient Egyptian tombs, excavations from ancient Mesopotamia presently Iran, ancient Babylon presently Iraq, and traces of herbal medicine from China dating as far back as 5 000 BC showed different and assorted herbs for different ailments. Malaria is generally though arguably believed to be among the ailments the ancient people prepared for its cure in the afterlife[13–15], therefore from the ancient people to date the choices of drugs for the treatment of malaria could and may have been influenced by several factors[17–19]. These include an understanding of the existence of the disease, its social as well as individual impact, and level of knowledge about availability of drugs used for its treatment[20–22].

Since the United Nations declared the year 2000–2010 as malaria decade with the constitution of the roll back malaria (RBM) initiative, efforts were made by the international...
organizations in collaboration with the malaria endemic nations primarily to bring the disease under control[23–25]. One of the key components of the RBM programme is the introduction of artemisinin–based combination therapy with home treatment and a re-definition of choices of antimalarial drugs. There was meant to create a high level of awareness on the recommended generally most potent antimalarial drugs available along with appropriate dosages to the people.

Ten years after the commencement of the RBM with the end of malaria decade, there is the need to assess the level of knowledge of the people about malaria treatment. Moreover recent studies in different parts of Benue state including Otukpo and environs in Nigeria showed a high prevalence of the disease[26–28]. A sustained control of malaria in a community would require, among others correct knowledge of the potent antimalarial drugs by the people for proper home management of the disease through home based malaria management (HBMM) programme. This requires clinical diagnosis of malaria at home by trained health personnel and subsequent prompt treatment with artemisinin combined therapy (ACT) or other potent antimalarial drugs with the training of the people at home on common symptoms and signs of malaria as well as the potent antimalarial drugs with correct dosages. The success of this treatment portfolio (HBMM) would significantly impact positively on the overall success of the RBM programme in a community. This would substantially reduce both morbidities and mortalities directly or indirectly associated with malaria in Africa[29–31]. This study was therefore set up to assess the level of self-medication and choices of drugs for malaria treatment among residents of Otukpo and environs, a semi–urban community in western Africa with a near-year-round high malaria transmission after a decade of malarial control.

2. Materials and methods

2.1. Study area

The study was carried out in Otukpo, a semi–urban community in Benue state of north–central Nigeria. It is located in the Savannah zone between latitude 7° 20’ N and longitude 8° 12’ W, and latitude 7° 20’ S and longitude 8° 20’ E with annual rainfalls of about 1 650 mm from April to October. Based on the 2006 population census, the town is estimated at 600 000 inhabitants; at least 95% are of Idoma ethnic group while the remaining 5% is shared among the Ibos, Tivs, Hausa and Igede ethnic groups.

2.2. Study setting

The study was carried out between October and December 2009. Five major parts of the town comprising Ogwonu Igbolafa, Ukpu, GRA, Sabon geri and Oweto were selected to cut across, ethnic, socioeconomic, and religious backgrounds of the inhabitants. Interviewers were trained on the art of questionnaire administration and subsequently recruited for the study. All adult women aged 18 years and above in each household were individually interviewed to assess their knowledge about malaria and choices of drugs used for its treatment. Women were selected for the study in the community because of the central role they play in the quality of healthcare delivery at home, either as caregivers to their children and grandchildren or to themselves especially during pregnancy and largely the healthcare of their spouses.

2.3. Sampling technique

Households were selected using systematic sampling methods in which one after another household in each direction faced by the interviewers was recruited into the study while the first household was selected with the aid of head or tail of a coin. Central locations in each part of the five key locations of the town were arbitrarily chosen as the starting point. Households were selected using systematic sampling methods in which one after another household in each direction faced by the interviewers was recruited into the study. Pre–coded and pre–tested questionnaires were either self or interviewer administered to the respondents to obtain the information[32]. Information such as age, educational level, occupation, marital status, parity and knowledge about malaria and choices of drugs for self–medication of malaria were obtained. Focused group discussions (FGDs) on factors surrounding choices of drugs chosen for self–medication were also carried out with 10 groups of adult women (average 11 women per FGD) this qualitative data was used to strengthen the quantitative data obtained from the questionnaires. Adult women were chosen for the study due to the significant role they play at home in determining the type and quality of healthcare either as caregivers to themselves, their children or grandchildren as well as to their spouses.

2.4. Data collection

For the purpose of the study, knowledge about antimalarial drugs was graded from Poor or below average (0), Average or Fair (1), and Above average or Good (2) as follows: Poor or below average– inability to list correctly at least one potent antimalarial drug; Average– ability to list correctly one or two potent antimalarial drugs; Above average– ability to list correctly more than two potent antimalarial drugs with or without ACT. FGDs were conducted using FGDs guide, the DILO (a day in the life of villagers) was adopted whereby the team designated to collect data in each locality worked only from morning to evening[32]. A minimum work was required from each but while they were moving in the town they were free to make use of any event (e.g. a febrile child, death, social gathering etc).

2.5. Evaluation of economic status for households

Principal component analysis (PCA) was used to develop wealth indices for the households based on ownership of durable assets including radio, television, telephone,
refrigerator, bicycle, motorcycle/scooter and car/truck. Ownership was coded as 0 or 1 and missing cases were excluded. The households were then divided into socio-economic quartiles based on their scores. Cronbach’s alpha was then calculated to test consistency-reliability[33, 34].

2.6. Data management and analysis

Data obtained was analysed using Epi Info 6 statistical software while Pearson’s Chi squared test or Mantel-Haenszel were used to determine association with a $P$-value of <0.05 accepted as significant. Fisher’s exact test was used to determine the predictors for correct knowledge about antimalarial drugs among the respondents[35]. Qualitative data was analysed using MAXQDA software. Each day, the team made use of the lessons learned in the previous working day.

3. Results

From the 3 385 questionnaires administered, 3 293 (97.3%) were returned of which 3 171 (96.3%) were correctly filled. The age range of the respondents was 18 and 83 years with a mean age of 38.5 years and a bimodal age of 27 and 34 years. Those aware of the existence of malaria were 99.5% (3 155). 83.5% (2 648) of the respondents knew the mode of transmission with at least one method of prevention and one correct drug for its treatment while the remaining 16.5% (523) had faint, cloudy or absent knowledge about malaria.

3.1. Effect of age on knowledge about antimalarial drugs

Analysis of age distribution of the respondents showed that 15.2% (47/310), 9.4% (92/979), and 23.5% (4/17) of those aged < 20, 30–39, and ≥80 years had poor knowledge about antimalarial drugs respectively. There was no significant age difference (Table 1).

Table 1

<table>
<thead>
<tr>
<th>Age interval (years)</th>
<th>Average &amp; above</th>
<th>Poor</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>≥20</td>
<td>263 (84.8)</td>
<td>47 (15.2)</td>
<td>310 (100.0)</td>
</tr>
<tr>
<td>21–30</td>
<td>708 (90.1)</td>
<td>78 (9.9)</td>
<td>786 (100.0)</td>
</tr>
<tr>
<td>31–40</td>
<td>887 (90.6)</td>
<td>92 (9.4)</td>
<td>979 (100.0)</td>
</tr>
<tr>
<td>41–50</td>
<td>429 (83.5)</td>
<td>85 (16.5)</td>
<td>514 (100.0)</td>
</tr>
<tr>
<td>51–60</td>
<td>226 (78.2)</td>
<td>63 (21.8)</td>
<td>289 (100.0)</td>
</tr>
<tr>
<td>61–70</td>
<td>156 (74.6)</td>
<td>53 (25.4)</td>
<td>209 (100.0)</td>
</tr>
<tr>
<td>71–80</td>
<td>52 (77.6)</td>
<td>15 (22.4)</td>
<td>67 (100.0)</td>
</tr>
<tr>
<td>≥81</td>
<td>13 (76.5)</td>
<td>4 (23.5)</td>
<td>17 (100.0)</td>
</tr>
</tbody>
</table>

SSE=2.973, df=7, MSE=4.248, $P > 0.05$.

3.2. Modes of approach to malaria treatment

A review of the most common modes of approach to malaria treatment among the respondents showed that 41.1% (1 302/3 171) would visit hospital or clinic, 36.0% (1 143/3 171) would buy drugs from pharmacy stores or chemists, and 10.7% (339/3 171) would usually take traditional herbs (Table 2). There was no clear cut boundaries among the respondents that used various options for malaria treatment. From FGDs however, the general order of approach to malaria treatment was herbs, the remaining drugs at home, drugs from shop, tepid sponging, and then lastly, seek advice from health personnel. Knowledge about ACT was found to be 15.0% (476/3171), and intermittent preventive treatment for malaria (IPTM) 4.7% (149/3 171); home based management of malaria (HBMM) programme was non operational, this is where trained health personnel would routinely visit homes with ACT and promptly treat clinical cases of malaria.

3.3. Choices of drugs for malaria treatment

Some of the drugs listed for treatment of malaria among the respondents include Panadol 8.7% (275), Fansidar 8.4% (103), Chloroquine 8.2% (260), Septrin 3.1% (98), and Ampiclox 4.2% (133), 5.0% (156) had no idea of any antimalarial drug (Table 2).

3.4. Effect of occupation on knowledge of antimalarial drugs

Based on occupation, all the healthworkers, military and paramilitary and 99.1% of the civil servants interviewed had average and above knowledge on antimalarial drugs. Also 90.2% (340), 86.5% (1 393), and 81.9% (68) of the petty traders, farmers and artisans respectively had good knowledge about antimalarial drugs, there was no significant occupational difference ($P > 0.05$) (Table 3).
Table 3
Occupational distribution and knowledge of antimalarial drugs among females in Otukpo, Nigeria [n (%)].

<table>
<thead>
<tr>
<th>Occupation</th>
<th>Average &amp; above</th>
<th>Below average &amp; poor</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Petty trading</td>
<td>340 (90.2)</td>
<td>37 (9.8)</td>
<td>377</td>
</tr>
<tr>
<td>Civil servant</td>
<td>220 (99.1)</td>
<td>2 (0.9)</td>
<td>222</td>
</tr>
<tr>
<td>Farming</td>
<td>1 393 (86.5)</td>
<td>217 (13.5)</td>
<td>1 610</td>
</tr>
<tr>
<td>Military/Paramilitary</td>
<td>61 (100)</td>
<td>0 (0.0)</td>
<td>61</td>
</tr>
<tr>
<td>Artisan</td>
<td>68 (81.9)</td>
<td>15 (18.1)</td>
<td>83</td>
</tr>
<tr>
<td>Applicant</td>
<td>527 (76.5)</td>
<td>162 (23.5)</td>
<td>689</td>
</tr>
<tr>
<td>Health worker</td>
<td>36 (100.0)</td>
<td>0 (0.0)</td>
<td>36</td>
</tr>
<tr>
<td>Business</td>
<td>53 (98.1)</td>
<td>1 (1.9)</td>
<td>54</td>
</tr>
<tr>
<td>Others</td>
<td>26 (92.9)</td>
<td>2 (7.1)</td>
<td>28</td>
</tr>
<tr>
<td>Unclassified</td>
<td>10 (90.9)</td>
<td>1 (9.1)</td>
<td>11</td>
</tr>
</tbody>
</table>

SST=4.00, df=15, MS=0.50, P>0.05.
NB: There was no significant association of any of the other professions with altered knowledge on antimalarial drugs compared to the health workers or military/paramilitary workers.

3.5. Effect of educational levels on knowledge of antimalarial drugs

Analysis of educational levels of the respondents vis-à-vis their knowledge of antimalarial drugs showed that 385 (12.1%), 521 (16.4%), 957 (30.2%), and 1 308 (41.3%) had nil, primary, secondary and tertiary education respectively. There was a strong association between level of educational attainment and increasing knowledge of antimalarial drugs among the respondents from 25.5%, 73.4%, 98.8% to 100% among those with nil, primary, secondary and tertiary education respectively (MD= 525.666 67, SE= 2.092 9, CI= 95%, P<0.05) (Figure 2).

Figure 1. Modes of approach to malaria treatment among females in Otukpo, Nigeria.

Figure 2. Knowledge of antimalarial drugs in relation to educational levels among females in Otukpo, Nigeria.
3.6. Effect of marital status on knowledge of antimalarial drugs

A review of the marital status of the respondents showed that 38.4% (1,217), 10.2% (325), and 51.4% (1,629) were singles, divorced/separated or widowed, and married respectively. The knowledge of antimalarial drugs was significantly higher among those married compared to the singles ($\chi^2 = 10.17, OR=2.22, RR=0.85, P<0.001$); there was however no significant difference between the separated or divorced or widowed compared to the singles ($\chi^2=0.31, OR=1.21, RR=1.03, CI=95\%, P=0.57$).

3.7. Effect of number of children on the knowledge of antimalarial drugs

Among the the 3,171 respondents, 1,224 (38.6%) had no child, 384 (12.1%) had one child, 787 (24.8%) had two children, and 674 (21.4%) had three or more children. There was a strong association between increasing number of deliveries and knowledge of antimalarial drugs from 35.5%, 47.9%, 62.0%, to 68.0% for those with nil, one, two, three and above number of deliveries respectively ($SS=8,000, MS=1,000, df=11, CI=95\%, P<0.05$). There was however no significant difference in level of knowledge of antimalarial drugs between those having and under five child and those having children greater than five years of age ($\chi^2=0.48, OR=1.22, RR=1.02, CI=95\%, P=0.67$).

3.8. Effect of family economy on knowledge of antimalarial drugs

A review of knowledge of antimalarial drugs vis-à-vis wealth index of the respective families showed that 1,111 (35.0%), 869 (27.4%), 603 (19.0%), and 588 (18.6%) belonged to wealth index of the respective families showed that 1 111 (35.0%), 869 (27.4%), 603 (19.0%), and 588 (18.6%) belonged to first, second, third and fourth quartiles. There was a strong association between knowledge of antimalarial drugs and increasing wealth index from 80.8% to 100% in the first to the fourth quartiles respectively ($SS=8,000, df=1,000, CI=95\%, P<0.05$) (Table 4).

Table 4
Knowledge about antimalarial drugs in relation to wealth index among females in Otukpo, Nigeria [n(%)].

<table>
<thead>
<tr>
<th>Quartiles</th>
<th>Above average</th>
<th>Average</th>
<th>Poor</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>First</td>
<td>775 (69.8)</td>
<td>123 (11.0)</td>
<td>213 (19.2)</td>
<td>1,111</td>
</tr>
<tr>
<td>Second</td>
<td>514 (53.2)</td>
<td>189 (21.7)</td>
<td>166 (19.1)</td>
<td>869</td>
</tr>
<tr>
<td>Third</td>
<td>105 (17.4)</td>
<td>442 (73.3)</td>
<td>56 (9.3)</td>
<td>603</td>
</tr>
<tr>
<td>Fourth</td>
<td>447 (76.0)</td>
<td>139 (23.6)</td>
<td>2 (0.4)</td>
<td>588</td>
</tr>
</tbody>
</table>

SS=8,000, df=1,000, $P<0.05$.

4. Discussion

The level of awareness about malaria among adult women in Otukpo town was found to be over 99%, while 83.5% knew about transmission, prevention and treatment. There were various approaches towards malaria treatment as 36% usually bought drug pharmacy or chemists, 10.7% would take traditional herbs, and 41.1% visit hospital or clinics. Paracetamol, Flagyl, Septrin, Ampiclox, Tetracycline were among the drugs listed for malaria treatment while 5% of the respondents did not know any antimalarial drug. There was a significant association between educational levels, being married, having children and increasing family income and knowledge of antimalarial drugs ($P<0.05$). There was however no significant difference among those with various occupations, age differences, as well as having or not and under five child in the house ($P>0.05$). Knowledge about ACT and IPTM was generally less than 15% while HBMM was non-operational in the community and its environs.

The findings from the present study appear to have significantly contributed to the high prevalence of malaria in a recent survey carried out in the community as well as other neighbouring communities[34-36]. The high reliance on self-medications with probably wrong drugs and dosages (>38%); the use of herbs with usually unproven antimalarial properties; and the obvious delays in the course of trial medications before seeking appropriate medical attention will no doubt contribute to several morbidities and mortalities and a continuous spread of the disease in the community. Introduction of HBMM using community health workers with special training in clinical diagnosis and treatment of malaria and other voluntary health workers would be useful in reducing malaria deaths in the community. Also introduction of community medicine distributors (CMDs) adequately armed with artemether + lumefantrine combinations so as to help introduce the more potent and efficacious antimalarial drug in the community. Findings from the present study compares well with that in Tanzania and Abeokuta, Nigeria where reliance on traditional medications for treatment of were found to compound the malaria burden in the respective areas[36,37]. Also the high rate of self-medications with over the shelf drugs for malaria treatment, as in the present study was a common practice in Ibadan, Nigeria and Ugandan communities with their associated respective high burdens of malaria[38-40]. Lack of adequate knowledge about antimalarial drugs appear to be a general problem across sub-Saharan Africa and has generally been attributed to the high mortality of the disease on the continent. A more aggressive health education campaign could probably improve on the people’s knowledge in this regard as well as elevating the literacy level of the communities to facilitate the general understanding of the malaria control programme including its drug treatment[41].

Regional blocks in Africa as well as individual member states should adequately collaborate on the on-going fight against malaria by accessing the global fund meant to fight malaria in Africa as well as other foreign aids towards the same cause[41-45]. A significant proportion of this fund should be devoted to the procurement and distribution of ACT freely to Africa’s most disadvantaged communities[46,47].

Findings from the present study are however different from the findings in Nairobi, Kenya, Dakar, Senegal and Kigali, Rwanda, where utilization of traditional medications for malaria was not a common practice[47-50]; and in Banjul,
The Gambia where self-medication for malaria was rare\[46\]. These feats were achieved due to the high awareness and treatment campaigns put up by the local authorities with a corresponding drop in malaria mortalities and morbidities\[51–53\].

We wish to make the following recommendations:

Public enlightenment should be stepped up in the community through town cries, erection of bill boards with jingles in local languages to redirect the people towards proper treatment of malaria. This should be extended to the traditional herbs vendors so as to limit their operations voluntarily through adequate health education and probable recruitment into integrated malaria control programme in the community.

Government should procure enough doses of ACT for free distribution to the people so as to break down the socioeconomic and knowledge barriers towards effective treatment of malaria in the community through drug availability at people’s door steps\[52\].

Policy formulators and implementers should see the urgent need to institute HBMM programme in the locality as well as recruitment of CMDs to reach out to the people for antimalarial drug distribution and also educate the people on the correct dosages of potent antimalarial drugs\[55\].

In conclusion, the present study has shown that as far as drug treatment of malaria and its components is concerned the RBM decade in Otukpo community failed to realise set goal. There is still a wide gap between the high level of awareness about malaria as a disease, and the low knowledge about appropriate drugs for its proper treatment among women in the community. This was largely attributed to illiteracy, socio-economic factors as well as a poor implementation of the RBM programme as a whole especially as concerns availability and distribution of potent antimalarial drugs including ACT in the community. These factors should therefore be reviewed and appropriately remedied.

Conflict of interest statement

We declare that we have no conflict of interest.

Acknowledgements

We wish to express our profound appreciation to Dr. Michael Odimayo and Ms Josephihe Agbo both of Department of Medical Microbiology and Parasitology, Benue State University Medical school and other members of the research team for their assistance towards administration of questionnaires. Our thanks also go to Mr Musa Toro of the Information and Communication Technology Centre, University of Jos, for analysing the data.

References


Self medication for oral health problems in Cameroon

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Objective: To assess the use of self medication in oral health problems in Cameroon. Methods: This multi-regional cross-sectional survey was conducted in three towns; Bamenda, Yaounde and Buea over a 10 month period. The questionnaire elicited information on demography, oral problem for self medication, substance used for self medication, source of the substance, duration of self medication, reason for self medication, source of advice of the drugs or those products used, opinion about the substance, effect and duration. Results: The prevalence of self medication for oral health problems was 67.8% which was significantly associated with age, marital status and location. The most frequently self medicated oral health problem was toothache (54.7%). The majority (64.5%) of the respondents used pharmaceutical products while a minority (7.7%) used dangerous substances such as petrol and vinegar for self medication. Sources of substances of self medication included pharmacy (55.6%), road side vendors (26.1%), native healers (7.8%), mobile drug vendors in buses (5.3%), and others (5.3%). The choice of substances used for self medication was mostly guided by the advice from relatives. Conclusion: The majority of the respondents self-medicated for oral health problems. Unmarried, urban residents, aged 21–30 years reported significantly increased self-medication for oral health problems. Evidently dangerous substances were utilised for self-medication in this study, necessitating awareness and other forms of intervention.

Key words: Access, behavioural science, oral health, pain, outcomes
problems. The only previous studies available were hospital based research\textsuperscript{17,18}. However, it is common knowledge that the majority of residents in developing countries have poor access to healthcare facilities. This scenario justifies the need for a community based survey to ascertain the actual magnitude of this form of health seeking behaviour. The objective of the study was to assess the use of self medication in oral health problems in Cameroon.

**MATERIALS AND METHODS**

This multi-regional cross-sectional survey was conducted in three towns; Bamenda, Yaounde and Buea which represent three out 10 regions in Cameroon. Bamenda represents the North West region, Yaounde represents the Central regions while Buea represents the South West regions. The study was conducted over a 10 month period (October 2009--August 2010). The calculated sample size for was 73 for each of the three regions based on the fact that the mouth and teeth accounted for 5% of self medication\textsuperscript{19}, 95% confidence interval and 5% error margin. Participants were both customers and traders in the respective markets which were selected randomly from the different parts of the market. Informed consent was obtained from the participants before administration of the questionnaire. Individuals, who have not experienced oral health problems and those who understood neither French nor English were excluded. The tool of data collection was a pretested, 17-item semi-structured questionnaire. The questionnaires were self-administered to literate respondents and interviewer administered to the illiterate respondents. The questionnaire elicited information on demography, oral problem for self medication, substance used for self medication, source of the substance, duration of self medication, reason for self medication, source of advice of the drugs or those products used, opinion about the substance, effect and duration. Ethical approval was obtained from the respective regional delegates of public health in the three provinces. Data analysis was done using Epi-info 3.5.1 and data were presented in tabular and graphic form. Test of significance was done using chi square statistics with \( P < 0.05 \) considered as significant.

**RESULTS**

A total of 283 individuals participated in the survey with 94 (33.2\%) from North West region, 95 (33.6\%) from Central regions and 94 (33.2\%) from South West regions. The majority of the respondents were 21--30-year-old (37.8\%), females (51.9\%), single (67.1\%) urban residents (56.5\%) and belonged to a low income group (78.8\%). The prevalence of self medication was 67.8\%.

Age, marital status, highest educational level, income status were significantly associated with self medication for oral health problems (Table 1). The majority of respondents (86.4\%) felt better after using the medications; out of which, 39.7\% and 31.2\% experienced the beneficial effect in 1 week and after 4 months respectively (Figure 1). Self medicated oral health problems were toothache (54.7\%), bleeding gums (13\%), bad breath (9.4\%), gum swelling, cheek problems (4.7\%), tooth mobility (4\%) and other dental treatment 14\% (Figure 2); out of which 64.5\% used pharmaceutical products, 27.8\% herbal products and 7.7\% other products such as petrol etc. (Figure 3). Sources of the self-medication were a pharmacy (38.0\%), hospital

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*Statistically significant.
pharmacy (17.6%), native healers (7.8%), mobile drug vendors in buses (5.3%), road side vendors (26.1%) and others (5.3%) (Figure 4). The reasons for indulgence in self medication were lack of time (37%), lack of money (46.5%) perception of problem as minor (13.8%) and tradition and religious belief (2.8%) (Figure 5). The choice of self-medication was guided by advice from relatives in 32.9% of the respondents (Figure 6). About four-tenths (43.2%) of the respondents believed the medications gave temporary pain relief, while under a quarter (20.7%) believed that they are effective, 16.2% useful in stressful situations, 9.9% didn't know about their effects and 4.1% believed that it cures illnesses (Table 2).
Table 2 Respondents’ attitude about self medication practices

<table>
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<tr>
<th>Opinion</th>
<th>Frequency (n)</th>
<th>Percent</th>
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<tr>
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<td>43.2</td>
</tr>
<tr>
<td>Effective</td>
<td>46</td>
<td>20.7</td>
</tr>
<tr>
<td>Useful in stressful situations</td>
<td>36</td>
<td>16.2</td>
</tr>
<tr>
<td>Don’t know about their effects</td>
<td>22</td>
<td>9.9</td>
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<tr>
<td>Curative in nature</td>
<td>9</td>
<td>4.1</td>
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<tr>
<td>Natural products</td>
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<td>2.3</td>
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<tr>
<td>Previous properly prescribed</td>
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<tr>
<td>They are cheaper option</td>
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DISCUSSION

The prevalence of self medication for oral health problem in this study was 67.8%. This was higher than 37.3% and 42.0% previously reported in hospital based research in the Ivory Coast and Nigeria respectively\(^{17,18}\), and 48% documented in Burkina Faso\(^{20}\). The higher prevalence implies that community based surveys are more valid than hospital based research in quantifying the actual magnitude of oral health behaviour. This is because not all oral health problems are eventually brought to the dentist’s attention as an earlier study revealed that as much as one quarter of the population gives up care despite experiencing pain or embarrassment due to oral health problem\(^{20,21}\). Age was significantly associated with self medication for oral health problems. The prevalence increased with increasing age climaxing at 21–30 years and decreased thereafter with the lowest level among the elderly. A similar assertion has been made by Yousef et al.\(^{22}\) in Jordan. Residence in an urban area was significantly associated with self medication for oral health problems in this study. The higher frequency of self medication among urban residents documented in previous study may be the explanation\(^{23}\).

Toothache affects diet, diet choices, disturbs sleep and impairs overall health motivating individuals to seek urgent help. Available literature shows that the main reasons for self medication is pain\(^{17,18}\). However, the use of self-medication by an individual in the clinical state of acute orofacial pain associated with lack of, or inadequate, care to relieve the symptoms\(^{24}\). Pain is distress in nature, thereby posing as a driving force for self medication in individuals to alleviate symptoms or avoid the need for dental attendance\(^{25}\). Gingival bleeding, gingival swelling and tooth mobility which are manifestations of periodontal disease result in chronic discomfort leading to self medication. Halitosis is a disturbing oral symptom that hampers personal and social relations thus necessitating attention seeking by individual sufferers in the form of self medication and others.

The majority of respondents (86.4%) felt better after using the medications. About one-third (31.2%) experienced the perceived beneficial effect after 4 months. The long duration before experiencing the perceived beneficial effect attest to chronicity of self medication which may be associated with adverse consequences like addiction, reversible and irreversible deformities, antibiotics resistance, bleeding tendencies, peptic ulcer and analgesics nephropathy.

Earlier studies indicated that reported poverty and lack of information are barriers to buccodental consultation services\(^{26}\). In this study, lack of money and lack of time were the most frequent reasons for using self medication for health problems. Other reasons included traditional belief, religious belief and perception of the problem as minor. The lack of financial means has been cited as the first obstacle in the accessibility of oral care\(^{20,21}\) and one of the main reasons of self-medication\(^{17}\). Time saving, financial reason and individual perception of the severity of the health condition have also been documented as the reason for self medication in Jordan\(^{22}\) and Nigeria\(^{27}\).

Analgesics were the most commonly used substances for self medication. This was similar to Souaga et al.’s\(^{17}\) finding in the Ivory Coast and Afolabi et al.’s\(^{18}\) finding in Nigeria. It could be explained by the fact that toothache was the most common oral health problem. Native herbs were the second most frequent utilised substances. High prevalence of consultation with traditional healers and local herb use for toothache among individuals living in the Tanga Region of Tanzania have been reported with 40% relief for more than 6 months\(^{28}\). It confirms the fact that individual in Africa that rely on self-medication for oral health problem are more likely to use modern medicines than traditional ones\(^{20}\). The disposition to utilise lay sources of care like native healers hampers the effectiveness of modern professional health agents and delivery system. There is evident reliance on traditional healers and plant products when dealing with a broad range of oral health concerns\(^{29}\) from ethnomedicine survey use of plants in the treatment of oral ailments like toothache, plaque and caries, pyorrhea and aphthae\(^{30}\). The role of the traditional healer in healthcare delivery and the belief in unorthodox care may have resulted in a high frequency of native herbs for self medication. One-fifth of the respondents used antibiotics for oral health problems, confirming the unrestricted access to antibiotics with its attendant complication in developing countries. Dangerous substances like vinegar, petrol, tobacco, alum and touch and go which are corrosive and unorthodox chemicals were used by 7.4% of the respondents. Such dangerous substances used for an oral health problem have also been reported in studies in the southern parts of Nigeria\(^{31,32}\). There is a need for reorientation as complications emanating from the use of these dangerous substances may either be reversible or irreversible. For example, some topically applied
substances when taken for tooth pain relief have been reported to cause oral chemical burns. In this study, the sources of substances for self medication were mainly pharmacies, followed by roadside vendors (general provision shops and kiosks along the road), native healers, mobile drug vendors in buses and others, like hawkers, village markets etc. In parallel, a large number of pharmacies, street-market traders and traditional healers play a significant role in providing oral health care. The unrestricted access and readily availability of drugs on demand from hospitals, pharmacies; patient medicine stalls, roadside stalls, and hawkers in developing countries account for the diversity of substances for self medication.

In this study, half (50.6%) of respondents reported receiving their advice from relatives and friends, 24.5% from pharmacists, 17.7% from personal knowledge, and 8.3% from traditional healers. This is similar to the findings of Yousef et al. in Jordan. Significant others were a veritable source of advice as they serve an important role in caring for sick family members or relatives. Pharmacists and patient medicine dealers in developing countries are consulted for any form of health problem because of their ease accessibility, fast services and no consultation fee. The utilisation of a traditional healer in an oral health problem among the respondents was 16.7% reported by a community dwelling adult Chinese people in Hong Kong experiencing orofacial pain but lower than the 1.3% reported in a household survey in Burkina Faso. The role of the traditional healer in dental care in developing countries may also explain their relevance in perpetuating self medications for oral health problem among the respondents.

The description of respondents experiences with self medication for oral health problems include temporary reliever of pain, useful in a stressful situation, natural product, cheaper alternative, effective, curative in nature and no felt effect. The varied nature of respondents’ experiences with self medication for oral health problems may be explained by the diversity of oral health conditions, reasons and utilised substance for self medication. Some of the participants correctly described self medication as a step in self care behaviour. Lay measures in tooth pain relief, resulted in limited and uncertain benefits fitting the descriptors like temporary reliever of pain and no felt effect. Cheaper alternative, effective and curative in nature, descriptions may have guided respondents into falsely believing that self medication for oral health problem are appropriate thus perpetuating the behaviour.

CONCLUSION
The majority of the respondents self-medicated for oral health problems with pharmaceutical products, herbs, corrosive substances and unorthodox chemicals. Unmarried, urban residents, aged 21–30 years reported significantly increased self-medication for oral health problems. The high prevalence of self-medicating and the use of corrosive unorthodox chemicals reported in this study necessitate awareness creation and introduction of preventive and mitigating interventional programmes. Development of an official government policy on prescription and over-the-counter medications is also recommended.

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Self medication for oral health problems


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Survey of the occurrence of self-medication in the municipality of Itajubá - MG

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Keywords: antibiotics, psychotropic, anti-inflammatory, analgesic, antipyretic.

Summary

In this study we conducted a survey of the occurrence of self-medication in the municipality of Itajubá, besides characterizing this practice. Home interviews were conducted with residents of the urban area of Itajubá, from April to August 2000. The drugs studied were divided into four categories, thus observed: 10% were antibiotics, psychotropic 10%, 26% and 54% cardiovascular medications analgesic, antipyretic and anti-inflammatory. According to those interviewed, 20% of drugs present in homes visited were used for self-medication, and approximately 50% of households surveyed contained at least one drug used by this method. Drugs used as self-medication, 94% were from the group of analgesics, anti-inflammatory and antipyretic; antibiotics were 4% and 2% psychotropics, which did not show any cardiovascular medicine as the product of self-medication. These data indicate that self-medicate in Itajubá, as well as in Brazil, represents a major public health problem.

Summary

In this study we did the rising of the self-medication occurrence in the city of Itajubá. Besides Characterizing That practice. Interviews were conducted with inhabitants of the urban zone of the city of Itajubá. The interviews were done in the period of April to August of 2000. The researched medications were divided in 4 categories, so we observed that: 10% were antibiotic; psychotropic 10%, 26% and 54% cardiovascular analgesic, anti-inflammatory and antithermics. According to the interviewees, 20% of the medications present in the visited residences were used by self-medication, and approximately 50% of the researched residences contained at least one medication used for self-medication. About the medications used self-medication, 94% of the group were of the analgesic, anti-inflammatory and antithermics; antibiotics were 4% and 2% psychotropics, it was not found any cardiovascular medication to self-medication product. Those data indicate that self-medication in the city of Itajubá, as well as in Brazil, represents a major public health problem.

Numbering pages in the magazine printed: 142 to 150
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INTRODUCTION

Self-medication is defined as the use of drugs without a prescription, mentoring and/or coaching the doctor or dentist (1) thus the use of this practice may not result in curing the disease, just masking the symptoms, and can lead to drug intoxication and physical or psychological dependence (2). For example, excessive use of analgesics such as dipyrene, can cause changes in the bone marrow, resulting in agranulocytosis, thrombocytopenia and/or severe anemia (3). Many analgesics can produce hypertension, increasing, including the risk of stroke (4). Moreover, the overuse of aspirin can aggravate gastrointestinal diseases, and bleeding risk (4.5). According to the Regional Pharmacy Council of State of São Paulo, only 25% of the population buy medicines correctly (6) and, according to the World Health Organization (WHO), 75% of antibiotics are prescribed inappropriately, with 90% of consumers buy these drugs at lower doses than recommended (7). WHO and Ministry of Health also show that Brazil has more than 32 thousand medicines available in the market, while for many different diseases would not be needed more than 420 products. Therefore, these data make Brazil the world's sixth buyer drugs (8), and 50% of these sales are made without prescription, i.e. correspond to self-medication (9). Moreover, in Portugal, for a market 12 thousand drugs, only about 5% of sales originate from self-medication (10). In general, in Europe, although in small proportion, the use of self-medication has increased as a result of consumer pressure by some sectors of the industry (10). The high degree of practice of self-medication in Brazil can be attributed to the quality of the health system of the country, which can not provide sufficient medical services to the population. (11) In this study we aimed to survey the occurrence of self-medication in the municipality of Itajubá besides characterizing this practice.

MATERIALS AND METHODS

This study is an observational, descriptive and cross-sectional population. Home interviews were conducted with residents of the urban area of Itajubá, from April to August 2000. In order to validate the proposed questionnaire was conducted during the month of November 1999 a pilot study which covered approximately 25 residential units. The sample size was previously calculated based on the total number of residential units in the municipality (n = 16,740), taking into account the distribution neighborhoods (n = 29), determining thereby the sample number totaling 336 residential units (12) being visited so far 250 households. In 33 of these did not find any medicine, so for purposes of analysis, these residences were discarded and is considered a total of 217 residences. To determine the residence to be visited was used to map the urban Itajubá November 1992. Were drawn to the streets of the neighborhoods to be followed by visiting the first house on the left of each street. The interview consisted of identifying data such as name, address, household income, type of occupation, level of education and number of people living in the house. Regarding the drugs found in the home were collected the following data: name and generic commercial, expiration date, symptoms that led the respondent to make use of the same, dosage used, the author of prescription use of prescription to purchase the medication, the frequency of use of it, if the doctor warned about the possible side effects, what the side effects submitted by users of the drug, whether the respondent was aware of its potential toxic if was successfully achieved using the same, local medicine storage and responsible for its acquisition. Importantly interviews were conducted by the authors, which are responsible for awareness of this
population to the risks of self-medication, the use of medications with expiration dates, as well as inform properly
store medicines. Statistical analyzes (descriptive statistics and chi-square) were performed using Statistica software,
and the level of significance set at p <0.05.

Figure 1 - Relationship between education level and residential units (RUs) that have at least one drug used for self-
medication (p <0.05).

Graph 2 - Forms of prescription found in this study made by a doctor, self-medication, pharmacy clerks or laymen.

RESULTS

Approximately 80% of households consist of visits to five people, with 43% of these only one component
works. Workers about 56% have a monthly income of up to five minimum wages, and 40% have primary level of
schooling or incomplete are illiterate and 70% are salaried. Respondents also reported that 92% of the drugs found
were acquired by adults. Of the 217 residential units and in 49% of them were found at least seven drugs. In 60% of
households drugs were stored improperly, and in 30% of these resided at least one child under the age of
eight. observed in this study, though, that the higher the education level of the residents, the largest number
residential units with at least one drug used for self-medication (p <0.05) (Figure 1). Results presented below are the
four classes of drugs studied (13). Thus we found that: 10% were antibiotics, 10% psychotropics, 26%
cardiovascular and 54% analgesic, antipyretic and anti-inflammatory. Of these, 8% had expiration dates, 4% of respondents were using the drug for symptoms not related and 6% used incorrect regarding the drug dosage. In 217 households found a total of 2098 drugs, representing an average of 9.7 per household, with 1024 of these, belonging to four groups, a total of approximately 50%. According to those interviewed, 20% of drugs were used for self-medication, 76% were prescribed by physicians, 2.5% were referred by laymen and 1.5% was obtained by indication of unlicensed pharmacies and drugstores (Chart 2). Analysis of the interviews also revealed that 78% of these drugs were bought with a medical prescription, and 60% were used occasionally and 40% of continuous use. Regarding side effects is important to note that 91% of prescription drugs had no major side effects mentioned by doctors. Conversely, 7% of users reported the occurrence of side effects with these drugs. Regarding knowledge of the potential toxicity of the drugs used, 11% reported knowing them. Importantly, approximately 50% of the residential units found at least one drug used as self-medication. Dos drugs used as self-medication, 94% was from the group of analgesics, anti-inflammatory and antipyretic; antibiotics was 4% and 2% psychotropic drugs, not being found no cardiovascular medicine as the product of self-medication (Figure 3). These drugs, 4.5% were with expiration dates, 0.5% was used incorrectly in relation to pathology, 6% were used incorrectly as your dosage, 91% were occasionally used continuously and 9%, 4% caused side effects and 3.5% of the drugs used did not provide the expected by users (Table 1). Moreover, we observed that the greater the number of drugs found in residence, the greater the number of housing units having at least one drug for self-medication (p <0.05) (Chart 4).
In our study we evaluated the occurrence of self-medication with respect to four groups of drugs: antibiotics, psychotropic, cardiovascular and analgesic, antipyretic and anti-inflammatory drugs, which make up 50% of the drugs found. Thus, we observed that 20% of these drugs were used for self-medication. However, since the respondents themselves about the practice of self-medication, we can not rule out the possibility that this rate is even higher. It is important to note that approximately 50% of households visited we found at least one drug used as self-medication, which indicates that half of the families interviewed in the habit of self-medication.

Regarding the distribution of medicines used as self-medication, we found that 94% of these are the group of analgesics, anti-inflammatory and antipyretic. This fact can be attributed to the ease of buying these drugs, since they are sold in supermarkets, drugstores and pharmacies in addition to being offered to the general public for consumption of self-service. Another important fact is the extensive marketing sponsored by large pharmaceutical companies that openly encourage the practice of self-medication. Moreover, the fact that it was found 10% of psychotropic drugs used as self-medication, which may be waived only upon presentation and retention of special prescription, and worrying leads us to the following question: in what way these drugs are being obtained? Likewise we find 10% of the drugs belonging to the class of antibiotics. Thus, we can state that this practice contributes greatly to the rapid pace of increase in bacterial resistance to these agents. this study we observed also that the higher the education level of the residents, the largest number of residential units with at least one drug used for self-medication, suggesting that more educated individuals believe they can solve, often some health problems without seeking medical advice. CONCLUSION These data indicate that self-medication in Itajubá represents an important and complex public health problem, often encouraged by the large pharmaceutical industries.

Bibliography
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Household survey of treatment of malaria in Hajjah, Yemen

A. Abdo-Rabbo

ABSTRACT The practice of self-medication is widespread in the Republic of Yemen. The objectives of this study were to describe the treatment of malaria in households and to promote rational treatment. We surveyed 201 households with family members suffering from malaria or being treated with antimalarials. Numbers of prescribed and non-prescribed drugs were recorded and treatment rationality assessed. Common patterns of irrational treatment of malaria were observed. Polypharmacy was common, with an average of 3.8 total drugs and 1.3 antimalarials found per encounter. Misuse and overuse of injectable antimalarials was common. People practised self-medication because of belief, experience, lack of confidence in health services and cost of treatment. Most had no knowledge concerning possible risks of antimalarials.

Enquête auprès des ménages sur le traitement du paludisme à Hajjah (République du Yémen)

RESUME L ’automédication est une pratique courante dans la République du Yémen. Les objectifs de cette étude étaient de décrire le traitement du paludisme dans les ménages et de promouvoir un traitement rationnel. Nous avons enquêté auprès de 201 foyers dont certains membres souffraient de paludisme ou étaient traités avec antipaludiques. Le nombre de médicaments prescrits et non prescrits a été enregistré et la rationalité du traitement a été évaluée. Des caractéristiques courantes de traitement irrationnel ont été observées. La polypharmacie était courante, avec une moyenne de 3,8 médicaments au total et 1,3 antipaludiques trouvés par visite. L ’usage inapproprié et l ’abus d ’antipaludiques injectables étaient courants. Les personnes pratiquaient l ’automédication pour plusieurs raisons : croyances, expérience, manque de confiance dans les services de santé et coût du traitement. La plupart d ’entres elles ne connaissaient pas les risques éventuels des antipaludiques.

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Introduction

Malaria is thought to kill about 1.1–2.7 million people worldwide each year, of which about 1 million are children under the age of 5 years [1]. The disease is a public health problem in the Republic of Yemen, and cases are reported throughout the year, with some variation from one geographic zone to another and from one season to another [2,3]. It is estimated that 60% of the 18 million population live under the threat of malaria infection and about 2 million are attacked annually. Estimated mortality is 1%, mainly among children below the age of 5 and pregnant women [4]. The predominant species of malaria parasite is *Plasmodium falciparum*, which is responsible for nearly 90% of all reported cases [3].

In Hajjah governorate, which is situated in the northern part of the country, malaria is a major health problem. It accounts for about 31.7% of all attendance to health facilities in the districts studied [5].

In addition to being treated at public and private health facilities, self-medication is widespread and is a frequently chosen practice. Many people in malarious areas may not have ready access to antimalarial drugs and to reliable and consistent information about malaria treatment and prevention [6]. They may use antimalarials, which may be counterfeit, obtained from informal sources. These drugs may be of variable quality, partially or completely ineffective and they are often used in inappropriate dosage [7].

In the Republic of Yemen as well as in many developing countries there is inappropriate, ineffective and inefficient use of drugs [8–11]. The 1985 Nairobi conference on the rational use of drugs organized by WHO marked the start of a global effort to promote rational drug use [12].

Curiously, little effort has been made to improve drug use in malaria-endemic countries and to assess the benefits of such improvement [13]. Unfortunately, no single study has yet been undertaken on the rational treatment of malaria in households in the Republic of Yemen.

The WHO Action Programme on Essential drugs (WHO/DAP) and the International Network for Rational Use of Drugs (INRUD) have made serious attempts to examine drug use rationality and have developed indicators for assessment [14,15]. The core drug use indicators they developed were used in this study.

The overall objective of this study was to describe the extent of antimalarial drug use and attitudes towards self-medication among families. The specific objectives were:

- to provide information on patterns of antimalarial drug use in households
- to determine the sources of information about self medication
- to identify the main reasons leading to self-medication
- to acquire baseline information for future wider studies and for targeting and evaluating interventions

Methods

This study was a cross-sectional survey conducted during the period January to May 2003. The sample comprised 201 households with members diagnosed with malaria or being treated with antimalarial drugs in 3 malaria endemic districts, Hajjah, Haradh, and Abbs, in Hajjah governorate, Republic of Yemen. Households with members diagnosed with malaria or being treated with antimalarial drugs were identified...
from prescriptions and patient registration books. The households involved in this study were selected by convenience method.

All prescribed and non-prescribed drugs, including antimalarials, found in households were recorded. The mean number of prescribed drugs only, non-prescribed drugs only, all drugs (prescribed plus non-prescribed) and antimalarial drugs only per encounter were calculated. The types and dosage forms of antimalarial drugs were counted. Drugs were identified from the prescriptions and/or packaging found in households.

A structured questionnaire about knowledge, attitude and practices concerning malaria treatment in households was developed as the instrument of this field survey and covered:

- expectations/motivations with regard to the practice of self-medication;
- alternatives to self-medication in case of no relief;
- knowledge of possible adverse effects and appropriate use of antimalarial drugs;
- sources of information on practising self-medication;
- manner of requesting drugs from private pharmacies and drugstores;
- who bring the drugs from the private pharmacy or drugstore?

A pilot study was carried out in order to test the questionnaire and train the interviewers. The data was collected by trained health workers supervised by qualified researchers.

Data collectors went from house to house and surveyed those households that had people suffering from malaria or being treated with antimalarial drugs. It was planned to survey 60 households in each district. In fact, data were collected from 83 households in Hajjah, 58 in Haradh and 60 in Abbs. Only those household members suffering from malaria or being treated with antimalarials were interviewed. All the collected questionnaires were used in the study. All the people interviewed participated voluntarily and were requested to answer the questions freely. No-one refused to participate.

**Results**

The results for number of drugs found in the 3 study areas are shown in Table 1. The overall mean number of drugs per prescription was 2.89, mean 1.28 for antimalarials. The highest number of antimalarial drugs on a single prescription was 3.

In addition to the prescribed drugs, self-medicated drugs were found. The overall average was 0.87, with 0.04 for antimalarials. The highest number of non-prescribed drugs found in a single encounter was 3 drugs and 1 antimalarial drug.

The mean number of all drugs (prescribed plus self-medicated) per encounter was 3.76. The mean number of prescribed plus self-medicated antimalarial drugs was 1.32 (Table 1). The highest number of prescribed plus self-medicated drugs found in a single encounter was 8, of which 3 were antimalarial drugs.

The prevalence for different dosage forms of antimalarial drugs was: tablets 43.6%, oral liquids 13.9%, injections 42.5%. The prevalence of injectable antimalarials was 35.3% in Hajjah, 40.7% in Haradh and 53.9% in Abbs (Table 2). There were incidences where 2 different injectable antimalarial drugs were found.

Table 3 shows the prevalence for 6 different antimalarial drugs found in use in the survey areas. Three antimalarials were found in some encounters.
Table 1 Prevalence of prescribed and self-medicated antimalarial and other drugs in 3 areas of Hajjah governorate, Republic of Yemen

<table>
<thead>
<tr>
<th>Town</th>
<th>No. of encounters</th>
<th>No. of drugs</th>
<th>Mean no. of drugs/encounter</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>All</td>
<td>AM</td>
</tr>
<tr>
<td>Prescribed drugs</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Hajjah</td>
<td>83</td>
<td>218</td>
<td>101</td>
</tr>
<tr>
<td>Haradh</td>
<td>58</td>
<td>178</td>
<td>81</td>
</tr>
<tr>
<td>Abbs</td>
<td>60</td>
<td>185</td>
<td>76</td>
</tr>
<tr>
<td>Total</td>
<td>201</td>
<td>581</td>
<td>258</td>
</tr>
<tr>
<td>Non-prescribed drugs (self-medicated drugs)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Hajjah</td>
<td>83</td>
<td>35</td>
<td>1</td>
</tr>
<tr>
<td>Haradh</td>
<td>58</td>
<td>67</td>
<td>5</td>
</tr>
<tr>
<td>Abbs</td>
<td>60</td>
<td>72</td>
<td>2</td>
</tr>
<tr>
<td>Total</td>
<td>201</td>
<td>174</td>
<td>8</td>
</tr>
<tr>
<td>Prescribed + self-mediated drugs</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Hajjah</td>
<td>83</td>
<td>253</td>
<td>102</td>
</tr>
<tr>
<td>Haradh</td>
<td>58</td>
<td>245</td>
<td>86</td>
</tr>
<tr>
<td>Abbs</td>
<td>60</td>
<td>257</td>
<td>78</td>
</tr>
<tr>
<td>Total</td>
<td>201</td>
<td>755</td>
<td>266</td>
</tr>
</tbody>
</table>

AM = antimalarial drugs.

The attitude of the people interviewed with regard to self-medication were:
- They were hopeful that self-medication would result in recovery.
- They believed in the effectiveness of self-medication from their previous experience.
- They felt that the disease is simple, can be treated easily and does not require medical consultation.
- They had no desire to visit the health worker.
- They had little confidence in the health worker.
- The cost of treatment was lower.

The majority of people interviewed mentioned that they would use any alternatives to self-medication if no relief was obtained. Most of the respondents had no knowledge concerning the possible health risks (adverse effects, contraindications and interactions) of their antimalarial drugs, nor did they have knowledge of the appropriate use of these drugs.

The households obtained their knowledge to practice self-medication with antimalarial drugs from a private pharmacy or drugstore, families, relatives, friends and acquaintances or through self-knowledge owing to previous treatment.

The manner in which non-prescribed antimalarial drugs were requested by households from private pharmacies or drugstores included giving the name of the drug class (antimalarial) or drug name (e.g. chloroquine), stating the disease directly (malaria), describing the symptoms or complaints (fever), showing an empty drug container or outer packet, describing drug
### Table 2: Prevalence of dosage forms of all (prescribed and non-prescribed) antimalarial drugs in 3 areas of Hajjah governorate, Republic of Yemen

<table>
<thead>
<tr>
<th>Health facility</th>
<th>n</th>
<th>Tablet (P = 0.04) No. (%)</th>
<th>Oral liquid (P = 0.93) No. (%)</th>
<th>Injection (P = 0.04) No. (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hajjah</td>
<td>102</td>
<td>51 (50.0)</td>
<td>15 (14.7)</td>
<td>36 (35.3)</td>
</tr>
<tr>
<td>Haradh</td>
<td>86</td>
<td>40 (46.5)</td>
<td>11 (12.8)</td>
<td>35 (40.7)</td>
</tr>
<tr>
<td>Abbs</td>
<td>78</td>
<td>25 (32.1)</td>
<td>11 (14.1)</td>
<td>42 (53.9)</td>
</tr>
<tr>
<td>Total</td>
<td>266</td>
<td>116 (43.6)</td>
<td>37 (13.9)</td>
<td>113 (42.5)</td>
</tr>
</tbody>
</table>

P-values for \( \chi^2 \) tests. 

AM = antimalarial.

dosage form and colour (e.g. brown ampoule), or taking the patient to the private pharmacy or drugstore.

Most antimalarial drugs required for self-medication were meant for family use within the household. In many cases younger sons, relatives or neighbours were involved in requesting drugs from the pharmacy or drugstore.

### Table 3: Prevalence of each type of antimalarial drug (prescribed and non-prescribed) in 3 areas of Hajjah governorate, Republic of Yemen

<table>
<thead>
<tr>
<th>Area</th>
<th>n</th>
<th>CQ (P = 0.01) No. (%)</th>
<th>Q NV No. (%)</th>
<th>SP (P = 0.08) No. (%)</th>
<th>PQ NV No. (%)</th>
<th>ART NV No. (%)</th>
<th>HAL NV No. (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hajjah</td>
<td>102</td>
<td>77 (75.5)</td>
<td>0 (–)</td>
<td>23 (22.6)</td>
<td>0 (–)</td>
<td>2 (2.0)</td>
<td>0 (–)</td>
</tr>
<tr>
<td>Haradh</td>
<td>86</td>
<td>50 (58.1)</td>
<td>3 (3.5)</td>
<td>22 (25.6)</td>
<td>8 (9.3)</td>
<td>2 (2.30)</td>
<td>1 (1.2)</td>
</tr>
<tr>
<td>Abbs</td>
<td>78</td>
<td>45 (57.7)</td>
<td>4 (5.1)</td>
<td>29 (37.2)</td>
<td>0 (–)</td>
<td>0 (–)</td>
<td>0 (–)</td>
</tr>
<tr>
<td>Total (mean)</td>
<td>266</td>
<td>172 (64.7)</td>
<td>7 (2.6)</td>
<td>74 (27.8)</td>
<td>8 (3.0)</td>
<td>4 (1.5)</td>
<td>1 (0.4)</td>
</tr>
</tbody>
</table>

P-values for \( \chi^2 \) tests. 

NV = \( \chi^2 \) not valid.

Drugs: chloroquine (CQ), quinine (Q), sulphadoxine/pyrimethamine (SP), primaquine (PQ), artemether (ART) and halofantone (HAL).

### Discussion

Some patients self-medicated with antimalarial drugs and/or other drugs in addition to the prescribed drugs. All types of dosage forms as well as the different types of essential and non-essential antimalarials were available in the three districts studied and were used for self-medication.

The fact that often a person other than the patient bought antimalarial drugs makes it difficult to predict the extent to which these encounters were effective in informing the patient in terms of receiving information about drug use and related issues.

It is clear from the results obtained in this study that inappropriate practices, and consequently inappropriate use of drugs, are going on. This is borne out by results of other studies on self-medication that have been carried out in the Republic of Yemen and other developing countries, [16,17] (O. Attef, unpublished data, 1997) (A. Hattab, unpublished data, 1997).

In developing countries, self-medication should be considered a public health problem owing to lack of appropriate medical education in patients [18]. Although a
significant number of people throughout the world practise self-medication, only a very low proportion get information about medicines from sources in the community because very little appropriate information is available at this level [17].

Conclusion

Inappropriate self-medication in general, and self-treatment of malaria in particular, as found in this study, may result in ineffective and unsafe treatment. This in turn may cause health risks such as adverse reactions and discomfort for the patient. In addition, it may lead to a relapse of the disease and the development of drug resistance.

Although the aim of self-medication is prevention or treatment of disease, it can result in health hazards and economic losses for both the individual and the community [17]. It would not be possible or even desirable to try to eliminate self-medication completely. It is, however, important to find ways of using this practice to strengthen primary health care through educating consumers in how to avoid the irrational use of drugs. People should be informed about alternatives to self-medication, i.e. seeking qualified advice.

The deficiencies identified in this study will serve as a basis for targeting and evaluating future interventions. A proper antimalarial drug policy and adequate flow of reliable drug information is essential.

Recommendations

- Relevant interventions should be designed to improve the quality of treatment in malaria endemic areas of the country.
- Public health education about appropriate treatment of malaria should be more easily available to encourage people to go to health facilities for treatment when they feel sick and to make them aware of the negative impact of irrational self-medication practices.
- Private community pharmacies and drugstores should not dispense antimalarial drugs without prescription in areas where health facilities are available.

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