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Knowledge, Attitudes and Practices towards Malaria in Mbonge and Kumba Sub-divisions in Cameroon

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Authors' contributions

This work was carried out in collaboration between all authors. Author VM conceived and designed the study with input from authors JE, HM and NE. Authors VM, JE and NE performed the research. Author VM wrote the first draft of the manuscript. Author HM reviewed the manuscript. All authors read and approved the final manuscript.

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ABSTRACT

Aims: To assess knowledge, attitudes and practices regarding transmission, prevention and treatment of malaria in four rural settings and one urban neighborhood.
Study Design: Cross-sectional descriptive survey carried out in Cameroon.
Place and Duration of Study: This study took place in rural Mbonge division (Pete, Marumba-1, Marumba-2, and Bai Manya) and one neighbourhood in a urban town (Kumba), South West region of Cameroon between May and July 2015.
Methodology: 227 participants (118 males and 109 females) took part in this study. Information was collected with a pre-tested questionnaire with mostly closed-ended questions and a few open-ended questions. Questions focused on socio-demographic parameters, knowledge attitudes and

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practices with respect to malaria. Data was analysed using SPSS Statistics version 22 (SPSS Inc. IBM). *p* values <0.05 were considered significant.
Results: 118(52%) males and 109(48.0%) females were part of this study. Malaria was listed as the most common disease in all the settings without exception. In the rural settings, respondents related transmission of malaria to mosquito as follows: 53.3% in Pete, 70.7% in Marumba-2, 53.3% in Marumba-1, 65% in Bai Manya. In the urban setting, Kumba, 85.4% of respondents said malaria was caused by a mosquito bite. Other factors listed as ways in which malaria was transmitted include: using the same cup, dirtiness, dirty water, through drugs, bad environment, wind, sun and red fly. Mosquito nets were predominantly used for malaria prevention. These were obtained mostly as government donations. Respondents sought formal help mostly after 48 hours from onset of symptoms. Self-medication was commonly practiced irrespective of setting.
Conclusion: This study has shown that participants in Mbonge sub-division and Buea-road Kumba have gaps in knowledge about malaria transmission, prevention and treatment. There is a need for tailored health-education intervention building on formal and local knowledge to reduce the imposed burden of malaria.

Keywords: Knowledge; attitudes; practices; malaria; Mbonge; Kumba; Southwest; Cameroon.

1. INTRODUCTION

Malaria remains a serious public health issue in the world in general and in Africa especially where it accounts for 88% of all cases. Half of the world's population is at risk of becoming infected with malaria and an estimated 214 million new cases were recorded worldwide in 2015 [1]. African children are among most victims of malaria. Children under five years of age are most vulnerable to its consequences of cerebral malaria, anaemia, difficulty in respiration, hypoglycaemia and bloody urine due to the massive destruction of red blood cells [2].

Most of the people at risk for malaria live in areas where malaria is endemic. Due to the constant presence of the infection, some adults have become immune to the disease. However, immunity reduces especially during first pregnancy in women, making them a vulnerable group as well [2,3]. In this case, the intermittent preventive treatment with Sulphadoxine-pyrimethamine combination is recommended by the World Health Organisation [2].

Cameroon is a malaria-endemic country with varying transmission patterns over the country. Malaria is one of the major causes of morbidity and mortality in Cameroon [4,5]. It falls among the top reasons for hospital consultations, absence from school and work. Besides costs incurred from prevention and treatment, the wider economic and social consequences put a heavy toll on society. Up to 40% of the annual family income is spent on malaria prevention and treatment [6].

There was a turning point in Cameroon's policy on malaria in 2004 with the adoption of the WHO-recommended Artemisinin-based combination therapy (ACT) and the withdrawal from artemisinin-based monotherapies. In that same year, the Cameroonian government adopted a strategy of free distribution of mosquito nets [2]. This new strategy was followed up in 2011 with the distribution of over 8 million mosquito nets throughout the country [7] and another distribution program in 2015 [8]. In 2007, Cameroon adopted the recommendation of indoor residual spraying (IRS) as preventive action towards malaria [9]. These strategies are complementary and more effective when applied in combination. The recommendations for proper management of malaria and reduction of its adverse consequences include prompt diagnosis and treatment, compliance with effective treatment, reduction of the vector-human contact through preventive strategies, and utilization of mosquito nets [1]. The complexity of the disease also requires strategic decisions on how to make treatment most (cost-) effective. Improved preventive treatments such as mosquito control and bed nets reduce the need for curative treatments when effectively applied. With limited budgets this leads to dilemmas and imperfect strategies, a challenge for governments as well as individuals.

For many individuals in Africa, knowledge about malaria is typically a combination of local or informal knowledge and formal knowledge [10]. Local beliefs are important and must be taken into consideration as they shape peoples responses to diseases. The success and sustainability of health interventions in malaria are more likely if these beliefs are taken in to consideration in the planning and execution stages of the intervention. This is because, local

beliefs will determine collaboration (or not) of people with programs for malaria control, will determine interpretation and explanations of the causes, signs and symptoms of the disease by the people themselves and these will orient their actions [11] in terms of treatment sought and adherence to medication.

The aim of this study therefore was to assess the knowledge, attitudes and practices with regards malaria in four rural settings (villages) and one urban neighbourhood in South-West Cameroon. This was in order to provide evidence-based information necessary for appropriate tailored intervention policy in malaria control in Cameroon.

2. MATERIALS AND METHODS

2.1 Settings: Context and Participants

This study was carried out in the South West region of Cameroon, a region with a perennial malaria transmission pattern. Four rural settlements in Mbonge division (Pete, Marumba-1, Marumba-2, and Bai Manya) and one neighbourhood in an urban town Kumba (4°38'N and 9°27'E,) were included in the study. Marumba-2 is a junction village for the three other villages. It is bordered in the south by Marumba-1, in the west by Pete and in the north by Bai villages. The population of the villages range from 500- 1000 inhabitants per village. Most of the people in the above mentioned villages are farmers. They grow subsistence crops and produce for village markets in the area. Cocoa farming is another major source of income . The villages are between 20 and 25 km from Kumba and there is constant interaction of the people in these villages and the town of Kumba. Kumba(also known as K-town), is the capital of the Meme division. Villagers go to Kumba on a regular basis for small business, supplies and to socialise. Kumba is a local road junction making it very significant commercial zone. Kumba is mostly a trading town. Even though the original indigenes are the Bafaw in Kumba, it is now a cosmopolitan town inhabited by people from all parts of Cameroon(Bakossi, Banyangi, Bangwa, Bakweris, Meta etc.) and has an inflow of Nigerians doing business. The languages spoken in the study settings are English, Pidgin-English and some French (in Kumba). Also there are numerous indigenous languages spoken. The common language for communication is pidgin English.

2.2 Design and Data Collection

This cross-sectional study was carried out in the South West region of Cameroon. All inhabitants of the villages visited were eligible to participate in this study. The bigger villages Marumba-2 and Pete were divided into two parts with the help of the Chiefs and one part was selected randomly and all houses visited and asked to participate in the study. In the smaller villages- Bai Manya and Marumba-1, all the houses were visited in the village with the help of a guide designated by the chief. In Kumba, for convenience one neighbourhood (Buea road) was selected and all houses visited and asked to participate. The focus was to get one person per house to respond. Sometimes it was the head of the household, and other times an adult relative present at the time of the survey. The research team was made up of researcher (first and third and fourth authors and 2 trained assistants).

Information for this study was collected with the help of a questionnaire. The questionnaire had mostly close ended questions but there were a few open ended questions such as "what is malaria?". Demographic information obtained from participants included age, sex, educational level, marital status as well as employment status. Questions on the questionnaire were in relation to knowledge, attitudes and practices with regards to malaria(basic facts, prevention and treatment).

Examples of knowledge questions:

- How is malaria transmitted?
- Which names of drugs used for malaria treatment do you know?

An example question on practices:

- How do you protect yourself from malaria?

2.3 Statistical Analysis

Statistical Analyses was done using SPSS software (SPSS statistics version 22). Coded data were entered into the computer and checked for errors before analysis. Analyses performed included descriptive statistics, frequencies and cross-tabulations from multiple response questions as well as non-multiple response questions, Differences between proportions were obtained using chi-square analysis. *P* values< 0.05 were considered as statistically significant.

3. RESULTS

The participants in this study constituted 118 (52.0%) males and 109 (48.0%) females. Most of the respondents in the rural settings were farmers, mostly having completed primary or secondary schools while in the urban setting, most respondents had a university degree. Participants in the urban setting had more income than in rural settings whose income mostly fell below twenty thousand francs (about $33) a month. Socio-demographic characteristics are shown in Table 1.

3.1 Common Diseases in the Study Area

Malaria was stated as the most common disease in the study area (Table 2). This was mentioned on average 84.8% of the time followed by cough and catarrh (60.7%) and then fever (50.4%). Cough and catarrh were combined because they usually occur together in the settings.

Respondents reported that the presence of these common diseases in their study area was attributable to poor hygiene for the most count. Other reasons were poverty, lack of knowledge and climate.

3.2 Knowledge about Malaria

Respondents were asked in an open question to say what malaria was. Responses showed that in the rural setting between 50 and 58% said malaria was a disease (killer disease), between 17 and 20% of respondents said malaria was "something else" other than a disease while

Table 1. Demographic characteristics of the study population

Variable	Pete N(%)	Marumba- 2 N(%)	Marumba- 1 N(%)	Bai Manya N(%)	Kumba N(%)	*p* value
Gender						
Male	28(46.7)	28(68.3)	20(44.4)	14(35.0)	28(68.3)	0.005
Female	32(53.3)	13(31.7)	25(55.6)	26(65.0)	13(31.7)	
Age ranges						
<25	7(11.7)	5(12.2)	13(28.9)	10(25.0)	6(14.6)	0.025
25-34	27(45)	14(34.1)	10(22.2)	11(27.5)	15(36.6)	
35-44	11(18.3)	9(22.0)	7(15.6)	7(17.5)	16(39.0)	
45-54	8(13.3)	6(14.6)	11(24.4)	9(22.5)	1(2.4)	
55 and over	7(11.7)	7(17.1)	4(8.9)	3(7.5)	3(7.3)	
Occupation						
Unemployed	6(10)	2(4.9)	4(8.9)	5(12.5)	14(34.1)	0.000
Farmer	32(53.3)	30(73.2)	27(60)	15(37.5)	0(0)	
Employed	1(1.7)	1(2.4)	29(4.4)	4(10)	13(31.7)	
Businessman	7(11.7)	3(7.3)	4(8.9)	10(25)	5(12.2)	
Housewife	5(8.3)	3(7.3)	3(6.7)	3(7.5)	7(17.1)	
Other	9(15)	2(4.9)	5(11.1)	3(7.5)	2(4.9)	
Educational status						0.000
No formal education	7(11.7)	2(4.9)	4(8.9)	1(2.5)	0(0)	
Primary	33(55.0)	25(61)	20(44.4)	13(32.5)	1(2.4)	
Secondary	20(33.3)	13(31.7)	18(40)	22(55)	15(36.6)	
University	0(0)	1(2.4)	3(6.7)	4(10)	24(58.5)	
Other	0(0)	0(0)	0(0)	0(0)	1(2.4)	
Monthly income (thousands)						0.000
<20	35(58.3)	29(70.7)	22(48.9)	23(57.5)	8(19.5)	
21-50	20(33.3)	10(24.4)	16(35.6)	12(30)	14(34.1)	
51-75	3(5.0)	0(0)	3(6.7)	3(7.5)	6(14.6)	
>75	2(3.3)	2(4.9)	4(8.9)	2(5.0)	13(31.7)	
Marital status						0.052
Married	42(71.2)	27(65.9)	31(68.9)	19(47.5)	18(43.9)	
Single	12(20.3)	10(24.4)	11(24.4)	19(47.5)	21(51.2)	
Separated/divorced	2(3.4)	3(7.3)	2(4.4)	1(2.5)	0(0)	
Other	3(5.1)	1(2.4)	1(2.2)	1(2.5)	2(4.9)	
Distance to closest health care centre (km)	10(100)	2(100)	8(100)	<0.4(100)	0.4-1 (100)	0.000

Table 2. Reported common diseases in the study area. Results presented on this table are from multiple response questions implying that each respondent had the possibility of selecting one or more diseases as common

Common diseases in the study area	Settings					
	Pete N(%)	Marumba- 2 N(%)	Marumba- 1 N(%)	Bai manya N(%)	Kumba N(%)	Total
Malaria	54(90)	34(82.9)	31(70)	35(92.1)	36(87.8)	190(84.8)
HIV	0(0)	0(0)	0(0)	0(0)	2(4.9)	2(0.9)
TB	0(0)	0(0)	0(0))	1(2.6)	3(7.3)	4(1.8)
Cough and cartarrh	45(75)	23(56.1)	28(63.6)	24(63.2)	16(39)	136(60.7)
Diarrhoea	17(28.3)	10(24.4)	12(27.3)	7(18.4)	6(14.6)	52(23.2)
Typhoid	24(40)	11(26.8)	7(15.9)	6(15.8)	12(29.3)	60(26.8)
Worms	21(35)	13(31.7)	7(15.9)	6(15.8)	12(29.3)	59(26.3)
Fever	35(58.3)	20(48.8)	22(50)	18(47.4)	18(43.9)	113(50.4)
Other	3(5)	2(4.9)	6(13.6)	3(7.9)	1(2.4)	15(2.4)
Total	60(26.8)	41(18.3)	44(19.6)	38(17)	41(18.3)	224(100)

between 11 and 15% did not know what malaria was. In Kumba, the urban setting, 77.5% said malaria was a disease, 5% said it was "something else" and 17.5% didn't know what malaria was. Other definitions for malaria were: a virus, talking too much, feeling hot inside, feeling cold with fever, yellow fever, and body pain.

3.2.1 Transmission of malaria

When asked how malaria was transmitted, most respondents attributed malaria to the biting of a mosquito. In the rural settings, mosquito bites were said to be the cause of malaria in 53.3% in Pete, 70.7% in Marumba-2, 53.3% in Marumba-1, 65% in Bai Manya. In the urban setting, Kumba, 85.4% of respondents said malaria was caused by a mosquito bite. Other factors listed as ways in which malaria was transmitted included: using the same cup, dirtiness, dirty water, through drugs, bad environment, wind, sun, red fly, just to name a few.

3.2.2 Signs and symptoms of malaria

The most frequent symptom listed as presumptive for malaria was fever across all settings. The response frequency range was between 82% and 97%. Lack of appetite, shivering and headache were other common symptoms reported to be due to malaria. These symptoms are shown in the Table 3 in order of frequency mentioned.

3.3 Knowledge about Prevention Strategies

In response to knowledge about prevention strategies, participants predominantly reported the use of mosquito nets as a means to prevent malaria (Table 4). Other ways were grass-cutting around their homes, filling potholes and using insecticides. Some participants reported that they were not aware of malaria prevention strategies.

Table 3. Reported symptoms of malaria by participants. Results on this table are from multiple response questions

Symptoms for malaria	Settings					
	Pete N(%)	Marumba- 2 N(%)	Marumba- 1 N(%)	Bai Manya N(%)	Kumba N(%)	Total
Fever	56(96.6)	34(85.0)	43(95.6)	33(82.5)	38(92.7)	204(91)
Lack of appetite	23(39.7)	7(17.5)	11(24.4)	16(40.0)	21(51.2)	78(34.8)
Shivering	25(43.1)	8(20)	12(26.7)	10(25)	17(41.5)	72(32.1)
Headache	13(22.4)	5(12.5)	11(24.4)	9(22.5)	14(34.1)	52(23.2)
Sweating	17(29.3)	6(15)	11(24.4)	6(15)	9(22)	49(21.9)
Vomiting	12(20.7)	5(12.5)	4(8.9)	8(20.0)	14(34.1)	44(19.6)
Convulsions	5(8.6)	4(10)	3(6.7)	4(10)	12(29.3)	28(12.5)
Stiffness	11(19)	0(0)	1(2.2)	0(0)	0(0)	12(5.4)
Diarrhoea	2(3.4)	0(0)	1(2.2)	2(5)	3(7.3)	8(3.6)
Total	58(25.9)	40(17.9)	45(20.1)	40(17.9)	41(18.3)	100

3.4 Knowledge about Mosquito Nets

Respondents were asked if they knew what a mosquito net was. Most of the respondents answered yes to this question. However there were few who said they did not know what a mosquito net was. Only in the urban setting Kumba did no one say they did not know what a mosquito net was. In total 96% of the respondents knew what a mosquito net was and 4% reported that they did not know. These results were not significantly different across the settings. However, responses about knowing the different types of mosquito nets varied significantly across the settings (χ^2= 57.661, df=12, p<.001). In Pete (81.7%), Marumba-2 (50%), Marumba 1 (71.1%), Bai-Manya (55%) and Kumba (92.7%), participants were knowledgeable about at least one kind of mosquito net. There were others who did not know about different types of mosquito nets.

62.1.3%, 66.7%, 43.9%, 45% and 39% participants respectively in Pete, Marumba-1, Marumba-2, Bai-Manya and Kumba reported they owned insecticide treated mosquito nets- ITN- while others said they had either untreated nets or long-lasting insecticide treated nets. There were also people who were unaware whether their mosquito nets were treated of not (19%, 22%, 4.4%, 10%, 22%) in Pete, Marumba-2, Marumba-1, Bai-Manya and Kumba respectively.

3.5 Knowledge about Drugs for Malaria

Respondents were asked if they knew the names of medication for malaria. Their responses differed across the settings. Many respondents did not know the name of any malaria drug. Participants in some settings knew more about malaria drugs than participants in other settings. The results are shown in the Fig. 1.

It can be seen from Fig. 1 that participants in Bai-Manya (70%) were more knowledgeable of malaria drug names than any of the other villages in the rural settings. This was followed by respondents in Marumba-1(57.8%). In the other rural settings, many more people did not know malaria drug names. This was especially so in Pete and Marumba-2 where 71.2% and 61% respectively did not know names.

3.6 Attitudes towards Malaria

From the responses obtained with regards to malaria, it was seen that malaria was easily recognised as being the most common disease across the settings (Pete, 90%; Marumba-2, 82.9%; Marumba-1, 70%; Bai-Manya, 92.1%; Kumba, 87.8%) and also that it was considered a killer disease. The respondents therefore recognized the severity of the disease and also that it was a problem in their community. When asked how they would respond to a malarial attack, the responses varied across the settings. Some participants reported that they would go to the hospital (Pete, 31.7%; Marumba-2, 26.8%; Marumba-1, 31.1%; Bai-Manya, 47.5%; Kumba, 58.5%). Another portion of respondents said they would do self-medication (Pete, 55%; Marumba-2, 68.3%; Marumba-1, 53.3%; Bai-Manya, 45.0%; Kumba, 39.0%) while a few mentioned going to a traditional doctor (Pete, 13.3%; Marumba-2, 4.9%; Marumba-1, 15.6%; Bai-Manya, 7.5%; Kumba, 2.4%).

Table 4. Knowledge about preventive strategies for malaria

Knowledge of ways of prevent malaria	Settings					
	Pete N(%)	Marumba- 2 N(%)	Marumba- 1 N(%)	Bai Manya N(%)	Kumba N(%)	Total
Mosquito net	47(78.3)	37(90.2)	40(88.9)	36(90)	39(95.1)	199(87.7)
Prophylaxis	1(1.7)	1(2.4)	1(2.2)	3(7.5)	4(9.8)	10(4.4)
Grass cutting	27(45)	13(31.7)	6(13.3)	20(50)	19(46.3)	85(37.4)
Filling potholes	15(25)	1(2.4)	2(4.4)	5(12.5)	14(34.1)	37(16.3)
Using insecticides	6(10)	6(14.6)	3(6.7)	6(15)	16(39)	37(16.3)
Others	13(21.7)	3(7.3)	1(2.2)	2(5)	2(4.9)	21(9.3)
Don't know	7(11.7)	1(2.4)	2(4.4)	2(5)	2(4.9)	14(6.2)
Total	60(26.4)	41(18.1)	45(19.8)	40(17.6)	41(18.1)	227(100)

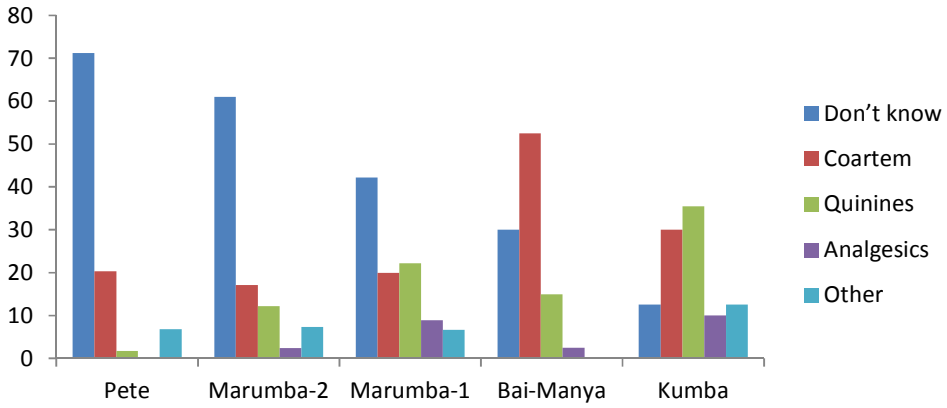

Fig. 1. Knowledge of drugs for treating malaria in adults in the settings

3.6.1 Response lapse between onset of symptoms and seeking formal health

Respondents were asked how long after the onset of signs and symptoms would they seek formal health care. The responses varied significantly across the settings (χ^2 =28.131, df=12, p=.005). In Pete, Marumba-2, Marumba-1, Bai-Manya and Kumba only 20%, 9.8%, 22.2% , 22.5% and 39.0% respectively reported they would go to the hospital at onset of fever. Therefore, 80%, 90.2%, 77.8%, 77.5%, and 61% respectively reported they would wait 48 hours or more before seeking formal treatment.

3.7 Practices towards Malaria in the Settings

3.7.1 Malaria treatment practices

Self-medication was a reported in the settings as a response to a malarial attack. This was reported to be from medication that are in stored their homes from previous treatments, medications bought from other non-formal sources without a prescription or from using traditional remedies such as herbs, roots, backs and other parts of plants. Coartem(which is the common name for the artemisinin-based chemotherapy-ACT- Athermether-lumefantrine drug) was mostly reported in the group of participants who knew names of drugs for malaria as what was commonly used. Quinines and anti-pyretic drugs were also reported as commonly used.

3.7.2 Drug purchase habits by respondents

The responses obtained about the drug-purchase habits among the respondents varied across the settings (Table 5). In some settings (Pete; 42.4% and Marumba-1; 53.3%) most purchases were done from the community vendors, in other settings from pharmacies (Marumba-2; 46.3% and Kumba; 63.4%) and others from the hospital (Bai Manya:47.5%). Very few respondents reported buying drugs from traditional healers.

Table 5. Drug purchase practices in the different settings

Drug purchase practices in settings	Settings					
	Pete N(%)	**Marumba- 2 N(%)**	**Marumba- 1 N(%)**	**Bai Manya N(%)**	**Kumba N(%)**	**Total**
Community vendors	25(42.4)	16(39)	24(53.3)	79(17.5)	0(0)	72(31.9)
Road vendors	2(3.4)	294.9)	0(0)	2(5)	7(17.1)	13(5.8)
Pharmacy	14(23.7)	19(46.3)	7(15.6)	11(27.5)	26(63.4)	77(34.1)
Hospital	11(18.6)	4(9.8)	14(31.1)	19(47.5)	8(19.5)	56(24.8)
Traditional doctor	7(11.9)	0(0)	0(0)	1(2.5)	0(0)	8(3.5)
Total	59(100)	41(100)	45(100)	40(100)	14(100)	226(100)

3.7.3 Other treatment for malaria

Even though it was not easy for some participants to come up with or remember the names of the drugs for treating malaria, participants were more aware of alternative treatment for malaria i.e. treatment that did not constitute the use of tablets. These included use of herbs, roots, backs, leaves and other parts of plants. In all the settings, most respondents (above 50%) reported having used traditional remedies at one time or another for treating malaria as shown in Fig. 2.

Plants reported to be commonly used for malaria treatment included mango leaves, pawpaw leaves, guava leaves, lemon grass, backs of trees, and others. These plants were used in combination by more than 80% of the respondents in each setting at one time or another.

3.8 Protection against Malaria

Respondents were asked how they protect themselves against malaria. Using mosquito nets and grass cutting around the house practices were commonly mentioned in the rural settings while using mosquito nets and insecticides mostly mentioned in Kumba.

It can be seen from Table 6 that, though the respondents are aware of ways in which malaria can be prevented (see Table 4), they do not consistently practice those prevention strategies.

3.8.1 Using mosquito nets to reduce the human-vector contact

Respondents unanimously said they used mosquito nets as a way to prevent malaria.

Even though, generally, more participants reported that their children slept in mosquito nets, when considered specifically to each setting, this response varied significantly (χ^2 = 19.102, df= 4, p<.001). Respondents from Pete, Marumba-2 and Kumba reported 56.7%, 63.7% and 58.5% respectively of children sleeping in mosquito nets while Marumba-1 and Bai-Manya reported a higher number of children sleeping in mosquito nets (82.2% and 87.5% respectively).

3.8.2 Source of nets

Most participants in all settings reported that they obtained nets as a donation from the government. Other nets were obtained from pre-natal consultations or bought at the pharmacy or market. Very few people bought the nets from the markets (10.2%, 4.9%, 4.4%, 2.5%, and 0% in Pete, Marumba-2, Marumba-1, Bai-Manya and Kumba respectively).

3.8.3 Advantages and inconveniences of mosquito nets

Responses about the advantages of mosquito nets was its ability to protect against mosquito bites. However some participants reported they could not think of any advantage of having mosquito nets. Concerning the inconveniences of mosquito nets (see Table 7), most respondents reported that major inconvenience of mosquito nets was the increased heat felt while sleeping in it. Few people reported that there was no inconvenience related to mosquito nets and even fewer reported it to be useless.

4. DISCUSSION

Malaria-based intervention strategies can have more value, be more appropriate and sustainable

Table 6. Strategies used by respondents to protect against malaria

Protection against malaria	Settings					
	Pete	Marumba- 2	Marumba- 1	Bai Manya	Kumba	Total
Mosquito net	44(73.3)	34(82.9)	40(88.9)	31(77.5)	33(80.5)	182(80.2)
Prophylaxis	2(3.3)	4(9.8)	0(0)	1(2.5)	3(7.3)	10(4.4)
Grass cutting	28(46.7)	8(19.5)	5(11.1)	18(45)	14(34.1)	73(32.2)
Filling potholes	13(21.7)	2(4.9)	1(2.2)	6(15)	11(26.8)	33(14.5)
Using insecticides	5(8.3)	6(14.6)	2(4.4)	6(15)	14(34.1)	33(14.5)
Others	14(23.3)	1(2.4)	0(0)	1(2.5)	1(2.4)	17(7.5)
Don't know	8(13.3)	7(17.1)	1(2.2)	3(7.5)	6(14.6)	25(11)
Total*	60(26.4)	41(26.4)	41(18.1)	40(17.6)	41(18.1)	227(100)

**Responses on Table 6 are based on multiple response questions (more than one choice answer was possible per respondent)*

when they take into consideration the local realities before the intervention. The local realities include what people know, their beliefs and what they do in relation to diseases which are common in their communities such as malaria. The results presented from this study, provide evidence for where emphasis can be made in the event of malaria control interventions.

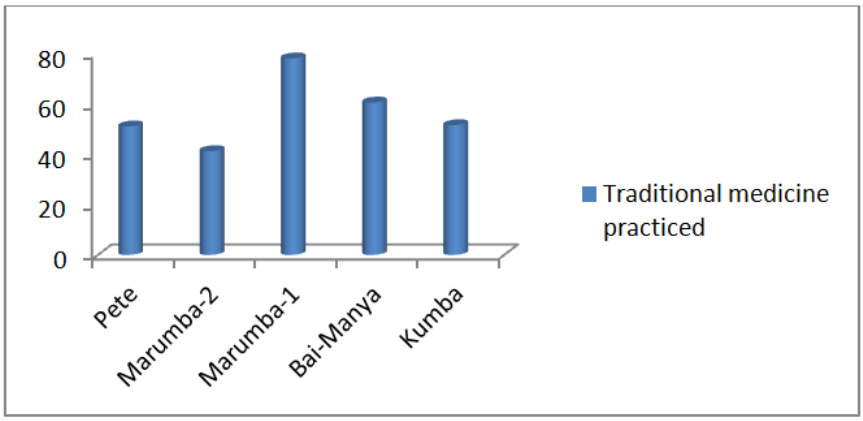

Fig. 2. Distribution of respondents who have used traditional remedies to treat malaria

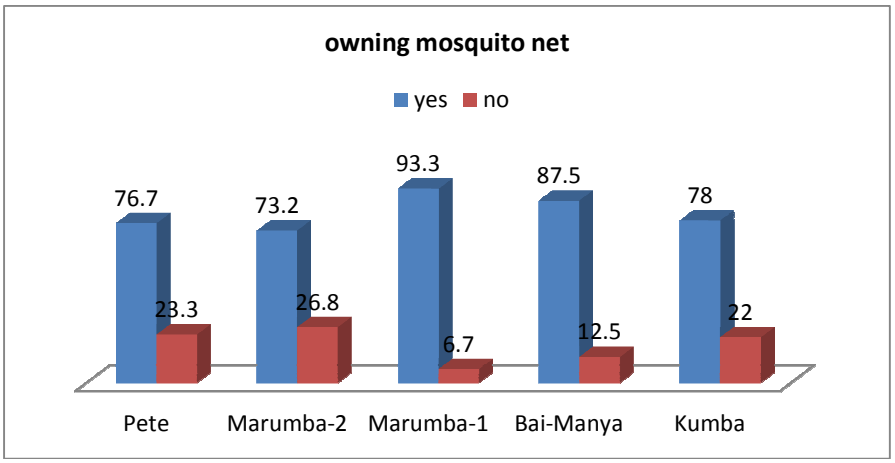

Fig. 3. Distribution of participants owning at least one type of mosquito net

Table 7. Inconveniences of mosquito nets as reported by the respondents

Protection against malaria	Settings					
	Pete N(%)	**Marumba- 2 N(%)**	**Marumba- 1 N(%)**	**Bai Manya N(%)**	**Kumba N(%)**	**Total**
Price	7(13.5)	6(15)	0(0)	0(0)	2(5)	15(6.9)
Heat	30(57.7)	22(55)	20(44)	29(72.5)	25(62.5)	126(58.1)
Suffocating	3(5.8)	0(0)	1(2.2)	5(12.5)	4(10)	13(3)
Inefficient	1(1.9)	2(5)	3(6.7)	2(5)	2(5)	10(4.6)
Useless	0(0)	0(0)	1(2.2)	0(0)	0(0)	1(0.5)
Hard to maintain	2(3.8)	3(7.5)	4(8.9)	1(2.5)	7(17.5)	17(7.8)
Nothing	9(17.3)	7(17.5)	16(35.6)	3(7.5)	0(0)	35(16.1)
total	52(100)	45(100)	45(100)	40(100	40(100)	217(100)

4.1 Knowledge about Malaria

Malaria was listed as the most common disease in all the settings without exception. It was usually called a killer disease, indicating that the respondents recognized its importance as a problem in their community worthy to be addressed [12]. This study has shown that most participants (on average 64.3%) are aware of what malaria is and that it is transmitted through mosquito bites. This is higher than what was found in Guinea [13] and Ndop in Cameroon [14] where only 18.5% and 27.7% respectively of respondents were able to link malaria to mosquitoes and similar to what was found in Orissa state India [15]. This awareness is however lower than 92.1% reported in North-western Tanzania [16]. Linking malaria to mosquitoes in this study was higher in the urban setting than in rural settings. This could be because the people in the urban setting were more highly educated than those in the rural settings [12,17] and so had had more opportunities especially in school to receive educative messages about malaria than those in rural settings. Other answers given by participants as to how malaria is transmitted - such as using the same cup, wind , sun, red fly, or dirty water- revealed gaps in knowledge of the people on this aspect [12,15,18]. Such knowledge gaps could lead to applying inappropriate preventive strategies. Identification of such gaps in knowledge is therefore of vital importance as it can inform where emphasis should be made in health education messages to ensure that they are suited for specific contexts.

4.2 Preventive Measures for Malaria

Using mosquito nets for malaria prevention was predominantly reported across all settings. Generally, most respondents (96%) knew what a mosquito net was. This was much higher than a study in Ethiopia in which only 41% of respondents knew what a mosquito nets was [19]. The number of people who reported to own at least one type of mosquito net in this study was much higher (range 73.2%-93.3%) than in Ethiopia where there were only 15.8% of participants owned nets [3]. This high number could be attributed to the free distribution by the government in an attempt to reduce the malaria burden in the country [7]. Participants however did not always know the type of mosquito net they had. This information is important in order to get the best out of owning a mosquito net. Untreated nets for example are not as effective as the insecticide treated nets (ITN) or the long-lasting treated nets (LLIN) [20]. Knowing the type of net in one's possession will inform whether re-treatment is indicated or not and this could ensure continuous efficiency of mosquito net. Re-treated nets provide better protection against malaria [20]. Apart from using mosquito nets, participants in the rural settings mostly reported cutting grass around houses as a preventive strategy while in the urban setting, participants mostly mentioned using insecticides. This difference in preference is probably linked to the cost of buying insecticides. The people in Kumba have relatively more money and are more able to afford insecticides than the people in the villages.

4.3 Practices with Regards to Malaria

Fever was the most recognised symptom of malaria in the study settings (>80% in each setting).This is similar to what was reported in Indonesia [18] and by Swedish travellers to malaria endemic countries [21]. The ability to recognise the signs and symptoms of malaria is crucial in getting timely and also hopefully appropriate treatment. People reported responding to malaria either by going to the hospital, by doing self-treatment or by going to traditional doctors. The time lapse however between the appearance of symptoms and the actual visit to the formal health care centre varied across the settings. This could be because the distances to health facilities also varied. It was most likely for people who live close to health facilities to make use to them than those who lived further away [22,23]. In the rural settings, except for Bai-Manya, going to the health care centres required between 5 and 10km distances to be covered on very bad roads. This travel time and condition could have an impact on the kind of response people will have when ill as mentioned previously. Bai-Manya was the only rural setting which showed a remarkable knowledge of medication for malaria and also a setting in which people got their drugs from the hospital. These aspects were comparable only to the urban setting Kumba in which people reported that they had formal health centres nearby as well. This aspect of Bai-Manya could be because it was the only village in the rural setting which had a health centre right in the village. The presence of this health centre could indicate accessibility and could have promoted use. In the other rural settings it was noticed that more than 50% of the respondents reported that they would self-medicate as a response to a malaria attack. This can be explained again by

the distances they have to cover before getting help on roads not usually accessible by cars. Most respondents indicated that they waited 48hours or more before seeking formal help. This was seen across the rural and urban settings. This is different from a study in Swaziland in which 81% of participants sought treatment within 24 hours of onset of symptoms [24]. WHO recommends that help for malaria be sought within 24 hours [25] but this is practically impossible in rural areas where many people dwell in poverty as well as lack access formal health services and therefore practise a lot of self-medication. Self-medication was reportedly practiced in all settings and especially with the adults. This also shows that for self-medication to occur, distance to health facilities is not the only factor at play. The practice of self-medication in the settings could also be because the demand made by the constant presence of malaria in terms of money for hospital care cannot be met by many people who will then resort to self-medication. Also this constant malaria presence could create a numbing effect encouraging people to handle the situation themselves. Handling it has been reported to mean buying medication from unauthorised or informal sources such as road vendors, community vendors and traditional doctors without a prescription. Risks exist in such practices such as inappropriate dose administration due to lack of knowledge by retailers [26]. Retailers could be enticing because of the possibility of getting retailed medication(small doses) and because they may be cheaper than medicine prescribed in the hospital. Self-medication practices also meant using herbs and other parts of plants. This probably because plants are also cheaper, available and may have less side effects. Also treating with herbs could be linked to the socio-cultural beliefs and practices of the people [27] and therefore making the practice more acceptable.

5. CONCLUSION

This study has shown that people in the Mbonge and Buea –road Kumba have gaps in knowledge about malaria transmission, prevention and treatment. The study has also shown that even though people are aware of certain ways in which they can prevent malaria, they are not consistently adhering to those ways. Within these general findings we see a strong connection between presence of medical facilities and knowledge about malaria transmission and treatment. Where such facilities are less present, people revert more to other forms of knowledge and prevention strategies. Providing better and accessible health services and tailored health education interventions will lead to an improved and sustainable management of malaria and reduce the burden it now imposes on Cameroon. In addition, anti-malaria policies and prevention campaigns should pay more attention to reducing knowledge gap with respect to basic facts about malaria before focusing on other more complex aspects pertaining to malaria.

6. LIMITATIONS OF THE STUDY

A limitation of this study is that we carried out this survey only with a small number of respondents in Kumba. Kumba is such a big town (over 140 thousand inhabitants) that by limiting the study to one neighbourhood we might have missed some interesting aspects in terms of knowledge attitudes and practices with respect to malaria in Kumba. We however selected the neighbourhood randomly from a list of neighbourhoods in Kumba and because a neighbourhood in Kumba does not differ much in size from the villages included in this study.

CONSENT

All authors declare that participants were explained the purpose of the study and an informed consent form was signed by those who took part.

ETHICAL APPROVAL

Ethical clearance was obtained from the Ethical Committee of the Institute for Medical Research and Medicinal Plant Studies (IMPM) of the Ministry of Scientific Research, Cameroon. Further authorisation was obtained from the Chiefs of the different settings.

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COMPETING INTERESTS

Authors have declared that no competing interests exist.

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