



Caregivers' Perception and Practices on Malaria in Children Under Five in EkombeBonji Health Area, Kumba Health District, South West Region of Cameroon

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DOI: 10.31080/ASMS.2020.04.0693

Received: May 25, 2020

Published: July 21, 2020

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Abstract

Background: Malaria is one of the diseases which contribute significantly to morbidity and mortality in Africa with 91% of deaths being children under-five. Despite all efforts to combat malaria, this disease still remains the leading killer of under five children killing a child every minute. Malaria usually progress to its severe state within a very short period of time. Generally mothers/caregivers are the first to recognize fever in children and also determine the decision to seek care. Therefore, recognition of the symptoms of malaria by caregivers and their practices toward seeking treatment is invaluable in order for malaria to be treated in a timely manner.

Objectives: The objective of this study was to determine the prevalence of malaria in children under five, and also to investigate the local perceptions, practices and treatment-seeking behaviour for malaria among their caregivers.

Methodology: This study was a cross sectional descriptive, community based study done from January to march 2014. Children under five years were enrolled for the study. Malaria RDT was done for parasitological evaluation. Questionnaires were administered to children's caregivers to collect socio-demographic data, knowledge regarding malaria, preventive measures and treatment seeking behaviours.

Results: Of the 350 children examined, 174 (49.7%) [95% CI: 44.37- 55.07%] were infected with malaria (plasmodium falciparum). Male and females were similarly infected (41.4% vs. 51.6%) with no significant difference (p = 0.4).The prevalence appeared to be highest 41 (23.6%) in the age group [24-36] months. Caregivers 280(80%) had proper knowledge on malaria with 316(90.3%) mentioning mosquito bite as the cause of malaria. Likewise fever/hot body was perceived as the commonest symptom of malaria by 332 (95%) of caregivers [95% CI: 91.9-987%]. With regards to caregivers' practices on prevention, 308(88%) use insecticide treated nets (ITN) as a preventive method. Only 205 (58.6%) of caregivers sought treatment at the health facility when their child was ill. As few as 119 (34%) did so within 24 hours of onset of symptoms. The most common home remedies employed were tepid sponging and use of anti pyretics.

Conclusion: Caregivers had a good knowledge of malaria (including its aetiologic agent, signs and symptoms and preventive measures). They also had a good practice towards preventive measures. However, the prevalence of malaria in under-five was high and only a lesser majority of caregivers sought treatment at the health facility in a timely manner.

Keywords: Caregivers; Under-Five Children;EkombeBonji; Cameroon

Introduction

Malaria infection has been one of the greatest health problems in the developing world for years and it is still a major health issue till date with an estimated yearly death rate of about 660,000 people. Most of these victims are children less than five years of age[1-3]. The disease still occupies the number one position among diseases of global public health importance[4-6]. It represents 20%-50% of all consultations in health centre and is the greatest cause of mortality in hospitals[7]. Even though it is both preventable and curable, it accounts for 10% of disease burden[4].

Malaria progression to its severe state is usually within a very short period of time, especially in children where severity can occur within 24 hours of onset of symptoms. To reduce morbidity and mortality of malaria, WHO has developed strategies which include as one of its main components the early diagnosis and prompt treatment of malaria[8].

Early diagnosis and treatment of clinical malaria and promotion of ITN constitute the current malaria control strategies in Cameroon. To achieve this goal the government since 2003 has put the following measures; free distribution of ITN especially to pregnant women and children under five; subsidizing the cost of ATCs; and training of community health workers[9]. Despite all these efforts, malaria continues to be a major cause of morbidity and mortality, accounting for 30 to 35% of the total annual deaths and 35% of childhood mortality. It is estimated that 41% (8.2 million people) suffer at least one episode of malaria per year with majority of them being pregnant women and children[10].

All over Africa children under five are highly affected by malaria. In Congo the prevalence of malaria in under five children is 39.3%[11]. According to the Cameroon's 4th Demographic Health Survey (DHS) report of 2011, the prevalence of malaria in children less than 5 years of age was 30% nation-wide[9].

Generally, mothers or caregivers are the first to recognize fever in children and also determine the decision to seek care. Therefore, recognition of the symptoms of malaria by caregivers and their practices toward seeking treatment is invaluable in order for malaria to be treated in a timely manner.

In our milieu, it is not known whether enough is known about the plasmodium parasite by the caregivers. Also, even in knowl-

edgeable individuals, little is known about their practices and treatment seeking behaviour on childhood malaria.

Materials and Methods

The study was a descriptive, cross-sectional community based study conducted in the EkombeBonji health area in the months of February and March 2014. Children under the age of five were enrolled in this study. Also caregivers of these children were needed to collect socio-demographic data, knowledge regarding malaria, preventive measures and treatment seeking behaviours. The study was conducted in the Ekombe health area, Kumba health District, Meme division, Cameroon.

Kumba is the head quarter of Meme Division in the South West Region of Cameroon. It is located in the Northern part of this Division with a total surface area of 286 km². Kumba has a population estimated at over seven hundred thousand (700,000) inhabitants.

The Kumba Health District is made up of 12 Health areas, and has a total population of 284,291 inhabitants[12]. The EkombeBonji health area is made up of 9 communities (Small Ekombe, Three corners Ekombe, EkombeBonji, Marumba I, Marumba II, Kingdon-gi, BaiBicon, Baimanja, Baimetoko) with an estimated population of under-fives at 3072.8 (16.9%)[12]. The major ethnic groups are the Bafaw, Bakundu, Oroko and the Balue. The main economic activity of the population is agriculture.

Study population

Children aged 6-59 months with their caregivers, living in the EkombeBonji Health Area, were recruited by means of cluster sampling during household visiting. A household was defined as a person or group of people living in the same house, who are answerable to the same head and share a common source of food and/or income[13]. The health area was divided into 9 communities each representing a cluster. A listing of all the clusters/settlements was made to form a sample frame, one of which was randomly selected.

Inclusion criteria

- Children under five years living in the Ekombe Health Area.
- Children from all origins, without discrimination of sex, ethnicity and religion.
- Caregivers who agreed to sign informed-consent forms.

Exclusion criteria

- Children under five years of age with no caregiver.
- All caregivers who will refuse to sign the consent form.

Sample size calculation

The sample size of 322 subjects estimated using the formula below [14]:

$$N = \frac{PQ(Z^2)}{d^2}$$

Where:

N = Minimal Sample Size

P = Prevalence of a given condition = Prevalence of Malaria in under five children in Cameroon [9] = 30%

Q = Inverse Prevalence (1 - P)

Z = Standard normal variate for a confidence level of 95% = 1.96

d = Degree of precision = 0.05

n = 322 subjects.

Study procedures

Preparation for data collection

- A training session involving the chief investigator and four health personnel of the Ekombe health centre was organized to practice rapid diagnostic testing to ensure quality control, and also for pre-testing of questionnaire.
- In order to facilitate response, sensitization about the research work was carried out in the locality of the Ekombe Health Area after seeking authorization from the community council and the chiefs.
- The cluster sampling method was used in order to choose participants for the study.
- Each caregiver was given an informed consent form for approval in order for them and their children to be involved in the study.

Data collection

Sampling procedure

The cluster sampling method was used. EkombeBonji health area is made up of 9 communities. Numbers were allocated to each

of the 9 communities and balloting was done where by Ekombe-Bonji was selected. All under-five children of that community with their corresponding caregivers were involved in this study during household visit. Prior to data collection, a consent form was presented with explanations of the study. A second balloting was not done as the sample size was met by the first community. The starting point was determined by spinning a bottle within the village square and picking the first house that is closest to the mouth of the bottle. The household without an eligible child was skipped and the next closest household visited.

Pre-coded questionnaires

A short structured questionnaire was administered to caregivers of these children during which interviews were done and data recorded in these questionnaires. This questionnaire comprises of sections A, and B:

- The sociodemographic information of both the child and the caregiver. This includes information such the gender and age of child, gender, age, occupation, marital status and educational level of the caregiver;
- Caregivers knowledge on malaria including attitudes and practices;
- Clinical data which includes axillary temperature ($^{\circ}$ C) and rapid diagnostic test results for each child. A sample of questionnaire is shown in the appendix.

Laboratory investigations

Following administration of questionnaires, Capillary blood samples of children under-five was collected and a Rapid Diagnostic Test (RDT) performed.

Principle of RDT

A spot rapid diagnostic test using a labeled CareStart Malaria HRP2 (Pf) test was performed. Malaria RDT detects specific antigens (proteins) produced by malaria parasites. These antigens are present in the blood of infected or recently infected people. The RDT signifies their presence by a colour change on an absorbing nitrocellulose strip. This procedure involved the following materials: An unopened capillary test packet, a new capillary tube, a new unopened alcohol swab, a sterile lancet, and disposable gloves.

A test packet was opened and the cassette removed. Using an alcohol swab the child's 4th finger was cleaned and air-dried. Using a sterile lancet this finger was pricked toward the side of the pulp. With the aid of a capillary tube, the blood-drop formed on the fin-

ger was collected, and then placed in the cassette well. Four drops of the diluents assay was added, and then timing started. Results were read and recorded in the questionnaire [15].

Interpretation of the test

- **Two bands:** The presence of two colour bands, "C" control and "T" test indicates *P. falciparum* positive results (Figure 1).
- **One band: negative:** The presence of one colour band ("C" control line) within the result window indicates a negative result (Figure 2).
- **Invalid result:** This is when we have colour bands in "C" and "T" or when there is a colour band in "T" and no colour band in "C" (Figure 3).

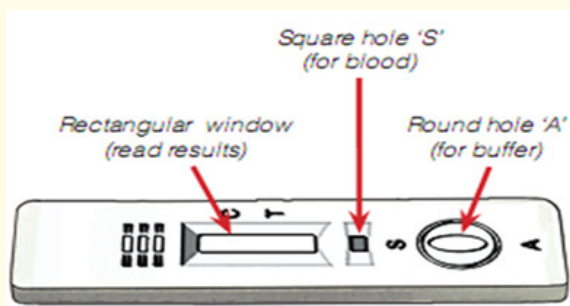


Figure 1: Invalid RDT.



Figure 2: Positive RDT.



Figure 3: Negative RDT.

If the control band ("c") failed to appear within the result window, the result considered invalid. The specimen was thus retested. All tests results were recorded in the questionnaire and also communicated to child's caregivers, explaining to them the significance of the results. Symptomatic subjects were prescribed Amodiaquine/Artesunate combination therapy and paracetamol (as need be) as recommended by the national policy for malaria treatment.

Data management and analysis

Data collected were analyzed using SPSS version 16 computer software to produce frequency tables. Data was entered and cleaned by consistency checks. Collected data was stored as different folders on the same computer and two USB mass storage devices were used as primary and secondary backup sources for the data and a tertiary backup was done in a private mail box on internet.

Descriptive analysis was used to describe the sociodemographic data of the children and their caregivers, and all objectives in the study and displayed as mean frequency and percentages tables. For objectives one and three, a P value <0.05 was considered significant.

Study Limitations

This study was limited by the fact that some caregivers could have given incorrect information because of the fear of being exposed. To solve these problems it was explained to the participants that information given shall be kept confidential, and also questionnaires were coded with numbers.

Ethical considerations

The study protocol was reviewed and approved by the ethical review committee of the Faculty of Health Sciences of the University of Buea, Faculty of Health Sciences Institutional Review Board (FHIRB) prior to beginning of the field work. Administrative clearance for the study was obtained from South West Provincial Delegations of Public Health. Also, authorization was obtained from the Kumba district medical officer, the community council and the quarter-head.

The principle of justice was respected, that is, the caregivers/child had the right to participate in the study or not and was not to experience any prejudice due to the fact that he/she did not agree to participate or for one reason or the other decided to abandon the study.

All parents were informed on the goals and interest of the research; and confidentiality of data collected and anonymity during publication of results was respected through attribution of child identification number.

All children found to be infected and symptomatic were pre-scribed Artesunate/Amodiaquine tablets (Artesunate 4mg/kg/day, Amodiaquine 10mg/kg/day) or Arthemeter/Lumefantrine tablets.

Sociodemographic data of participants

		Number (%)
Gender of child	Male	153 (43.4%)
	Female	198 (56.6%)
	Total	350 (100%)
Age group (months)	6-12	77 (22.0%)
	13-24	88 (25.1%)
	25-36	79 (22.6%)
	37-48	37 (10.6%)
	49-60	69 (19.7%)
	Total	350 (100%)

Table 1: Distributions of age and gender of children.

Characteristics		Number (%)
Gender of caregiver	Female	315 (90%)
	Male	35 (10%)
Age of caregivers (years)	21 - 30	214 (61.1)
	31 - 40	108 (30.9%)
	41 - 50	15 (4.3%)
	51 - 60	6 (1.7%)
	> 60	7 (2.0%)
Educational status of caregivers	No school	22 (6.3%)
	Primary	171 (48.9%)
	Secondary	152 (43.4%)
	Tertiary	5 (1.4%)
Occupational status	Student	27 (7.7%)
	Housewife	134 (38.3%)
	Trader	32 (9.1%)
	Public/private service	17 (4.9%)
	Farmer	89 (25.4%)
	Hairdresser/ seamstress	51 (14.6%)
	Marital status	Single
Married	278 (79.4%)	
Total	350 (100%)	

Table 2: Socio-demographic Characteristics of caregivers.

Prevalence of malaria in children

The overall prevalence of malaria parasite in this study population was 174(49.7%) by RDT[95% CI: 44.37- 55.07%].The high-

est prevalence [n = 41 (23.6%)] was in the range 25-36 months. The age range 36-42 had the least prevalence [n = 23(13.2%)]. Also, females [n = 102 (51.6%)] were more affected than males [n = 72 (41.4%)].But this was found to be statistically insignificant (P value=0.4)(Seetable 6).

Characteristics	Positive RDT	
		Number (%)
Gender	General	174 (49.7%)
	Male	72 (41.4%)
	Female	102 (58.6%)
Age groups (months)	6-12	36 (20.7%)
	13-24	40 (23.0%)
	25-36	41 (23.6%)
	37-48	231 (3.2%)
	49-60	34 (19.5%)
	Total	174 (49.7%)

Table 3: Distribution of RDT by age and gender of children.

Caregivers' knowledge on malaria in children

Causes of malaria

A majority of caregivers, [n = 316(90.3%)] attributed mosquitoes as the cause of malaria[95% CI: 86.57-93.09%]. Other causes of malaria mentioned were dirty surroundings and exposure to cold, drinking contaminated water and witchcraft. A small percentage [n = 3(0.9%)] never knewthe cause of malaria. See table 6 below.

Signs	Number (%)
Fever/Hot body	332 (94.9%)
Weakness	135 (38.6%)
Vomiting	132 (37.7%)
Loss of appetite	99 (28.3%)
Chills/shivering	94 (26.9%)
Convulsions	64 (18.3%)
Dark red nearly black urine	45 (12.9%)
Headache	44 (12.6%)
Body pains	38 (10.9%)
Sweating	26 (7.4%)
Anaemia (pallor of palms, conjunctiva)	18 (5.1%)
Splenomegaly	8 (2.3%)
Cough	6 (1.7%)
Diarrhoea	5 (1.4%)
Weight loss	3 (.9%)
Total	350 (100%)

Table 4: Signs of malaria in children.

Caregivers' perceived signs of malaria in children

At least one or more signs/symptoms of malaria were mentioned by caregivers. Fever [n = 332 (95%)] was the main sign/symptom mentioned by caregivers [95% CI: 91.9-987%]. Also, we had weakness [n = 135 (38.6%)] and vomiting at 132 (37%). Other symptoms mentioned were loss of appetite, shivering, body pains, sweating, black urine, convulsion, splenomegaly commonly called "corner belle" (See table 7).

Caregivers knowledge on malaria prevention

Use of mosquito nets [n = 325 (92.9%)] was the main method of prevention mentioned by the caregivers. Other methods of prevention mentioned were cleaning the surrounding, wearing long dresses on their children, and spraying insecticides. See table 8 below.

Signs	Number (%)
Fever/Hot body	332 (94.9%)
Weakness	135 (38.6%)
Vomiting	132 (37.7%)
Loss of appetite	99 (28.3%)
Chills/shivering	94 (26.9%)
Convulsions	64 (18.3%)
Dark red nearly black urine	45 (12.9%)
Headache	44 (12.6%)
Body pains	38 (10.9%)
Sweating	26 (7.4%)
Anaemia (pallor of palms, conjunctiva)	18 (5.1%)
Splenomegaly	8 (2.3%)
Cough	6 (1.7%)
Diarrhoea	5 (1.4%)
Weight loss	3 (.9%)
Total	350 (100%)

Table 4: Signs of malaria in children.

Preventive measures	Number (%)
Sleeping under mosquito	325 (92.9%)
Cleaning the surrounding	163 (46.6%)
Wearing long dresses	82 (23.4%)
Spraying insecticide	56 (16%)
Others (use of drugs, good feeding)	32 (9.1%)

Table 5: Caregivers' knowledge on malaria prevention.

Knowledge score

A total of seven questions in the questionnaire were used to formulate a score for assessment of the general knowledge of caregivers in this study. These questions comprise of knowledge on the cause, transmission, severity, prevention and treatment seeking behaviour [16]. Each of the correct answers were attributed a score of 1 and 0 (zero) if incorrect. A total knowledge score was then derived per caregiver.

Questions	Number (%)
1. What causes malaria in children malaria?	316 (90.3%)
2. Malaria can be transmitted to humans by?	268 (76.8%)
3. Do you think malaria can kill a child if untreated?	309 (88.3%)
4 Which of these are ways to prevent and control malaria?	317 (90.7%)
5. When do malaria mosquitoes feed?	146 (44.6%)
6. Where do you seek treatment if when your child is sick?	205 (58.6%)
7. How soon after suspecting malaria would you seek treatment?	119 (34.3%)

Table 6: Caregivers' response on knowledge on malaria in children.

The mean knowledge score for all caregivers was 4.82 with a SD=1.532. The minimum and maximum value 1 and 7 respectively.

Score	Number (%)
High > 4	280 (80%)
Low 1 - 3	70 (20%)

Table 7: Distribution of caregivers' knowledge on malaria.

Caregivers' practices on malaria preventions and treatment-seeking behaviour

Preventive measures caregivers take against malaria

Use of ITN was the main preventive measure by caregivers as 308 (88%) households possessed at least one bed net. Of this population, 210 (68.3%) children actually slept under the bed net the night before the study.

Other forms protecting their children from malaria were using of chemoprophylaxis, cleaning the surrounding and eating good food.

Preventive measures	Number (%)
Sleeping under a mosquito net	308 (88%)
Cleaning the surrounding	163 (46.6%)
Wearing long dresses	82 (23.4%)
Spraying insecticide/repellent	114 (32.6%)
Closing windows and doors	52 (14.9%)
Gauze wire on windows	36 (10%)
Others (use of drugs, good feeding)	32 (9.1%)

Table 8: Caregivers' methods of prevention of malaria in children.

Treatment- seeking behaviour of caregivers

A majority, [n = 205 (58.6%)], of caregivers sought treatment at the health facility when they suspected malaria in their child. Fewer caregivers [n = 11 (3.1%)] actually went to traditional healers.

Pace of treatment	Number (%)
Health facility	205 (58.6%)
Traditional healer	11 (3.1%)
Drug shop/pharmacy	122 (34.8%)
Home mgt	12 (3.4%)
Total	350 (100.0%)

Table 9: Where treatment is sought when child present sign/symptoms of malaria.

As many as 119(34%)caregivers took their children to a health facility within 24hours of onset of symptoms while 53(15%)caregivers went72hours after the onset of symptoms. See table 10 below.

	Number (%)
Within 24hrs	119 (34.0%)
2 - 3 days	178 (50.9%)
4 - 6 days	32 (9.1%)
7 or more days	21 (6.0%)
Total	350 (100.0%)

Table 10: How soon treatment for malaria is sought.

Home remedy	Number (%)
Anti-malaria	54%
Anti-pyretic	87%
Antibiotic	36%
Tepid spongy	63%
Traditional treatment	15%
Unknown	32%
Others	12%

Table 11: Home management.

Discussion

The prevalence of malaria parasite among under- five children was 49% in this study area. This finding is higher with regards to the DHS of 2011in Cameroon with a prevalence of 30%. This difference could be due to the fact that difference RDT devices were employed since as we used carestart RDT which has a higher sensitivity of 90.9% as compare 45% for SD Bioline[17].Also, a higher prevalence of 58.2% was observed in Nigeria by Nwaorgu.,et al.[18].This result was found to be higher than that of a similar study in Madagascar in 2013 with a prevalence of 10%[19].There was no significant relation between prevalence with gender and age of children. This reflects the equal exposure of these children to Anopheles mosquitoes' bites in the area. This was a similar finding by Nwaorgu.,et al.in Nigeria[18]. However, the age 25-36 months(2-3years) had the greatest prevalence at 46(23%). This was a similar finding by Nwaorgu who observed that prevalence peaked at 3years with 76%.

With regard to knowledge on the cause of malaria, majority of caregivers 316(90.3%) correctly attributed mosquito bite as the causeof malaria. This result was similar to those of Terence in Buea 89%and Faridah in Uganda 88%[20].Contrary to a study done by Dickson.,et al. in the Northern region of Cameroon were only 27.7% of participants correctly attributed mosquito bite to malaria.This could be associated to their level of education as only 75% of that community was educated, unlike this study population with a higher,328 (93.7%)level of formal education.

Although mosquito was mentioned as the main agent causing malaria by caregivers, some misperceptions such as exposure to sun/too much heat, exposure to dirty water and witchcraft were also observed. In Yaoundé it has been reported that malaria is as a result of excessive heat/sun and witchcraft.In Ghana a similar finding was observed[21,22]. Also in Uganda malaria if believed to be caused by exposure to bad environmental conditions[21]. Too much heat was also reported in Nigeria. This could be associated to their socio-cultural beliefs and also to the environmental conditions as Kumba is hot and humid with an average daily temperature at 27°C.

The majority (~100%) of caregivers mentioned one or more signs and symptoms of malaria. This is of great importance in early presumptive diagnosis and hence early treatment of malaria in children. The most frequent signs/symptoms were fever 332 (94.9%), Weakness 135 (38.6%), Vomiting 132 (37.7%) Loss of appetite 99 (28.3%) Chills/shivering 94(26.9%).This is similar to a study done by Wakgari in Ethiopia were 97% of caregivers mentioned fever as the most frequent signof malaria[23], and also by Spencer in Kenya,>90%[24].In Cameroon northern region Dickson.,et al. found

that 61.7% of participant mention fever. This difference could be explained by the discrepancy in the level of education as earlier mentioned.

Most, 325 (92.9%), caregivers mentioned mosquito nets as a means of preventing malaria in children. Other methods of prevention were cleaning the surrounding, wearing long dresses to their children, use of insecticides.

There was thus a high level of general knowledge on malaria among caregivers as the majority 280 (80%) of scored high on the total knowledge score. Majority of the population had attended some level of formal education. This could explain the high level of general knowledge on malaria among caregivers. Also it is of great importance; especially in situations where community based health programs need to involve the mothers/caregivers in health interventions such as ICCM.

Studies done by Ahorlu and Tatem have proven that people's perception of the cause of malaria has a strong impact on their preventive measures such as ITN [22,25,26].

Majority 302 (88%) of caregivers in this study area possessed at least one ITN. This is similar to studies done in Buea were 75% of respondents had an ITN in their homes. In Ethiopia, Wakgari-observed that 93% of caregivers of under-five children possessed at least one ITN [23]. This was also observed in Uganda 87% [20]. However, Dickson, *et al.* observed 1.2% of the participants in the Ndu community possessed a mosquito net. The reason here could be the discrepancy in the educational status. However, analysis on the association between educational status and possession of ITN was not significant in this study. This could be due to the massive campaign and distribution of free ITN in 2010 in the country, irrespective of educational status, explaining the high prevalence of ITN [27].

Among the incorrect methods of prevention eating good food, avoiding too much sun, and also use of chemoprophylaxis with anti malarias such as Coartem, quinine and paracetamol. This finding was also noted in the northwest region, Yaounde, Ghana and Nigeria [18]. This method of indiscriminate use of anti malaria for prevention is discouraged by WHO as it results to increased drug resistance.

As elsewhere in Africa, it was observed that caregivers seek treatment from a variety of sources upon presumptive diagnosis of

malaria. In this study area, 205 (58.6%), of caregivers sought treatment at the health facility when they suspected malaria in their child. Others bought drugs from drug shops and managed their sick child at home. Only 119 (34%) of caregiver went to a health facility within 24 hours of onset of symptoms. Most 178 (50.9%) of caregivers sought treatment within 24-36 hours of onset of symptoms. This is similar to study in Cameroon where 43% of caregivers said they took their children within 24 hours of onset of symptom [28]. This is however higher as compare to that of Madagascar where on 38% seek treatment at a health facility [18].

When further interview was done majority of them attempted started management at home either with left over drugs from previous consultations, or drugs bought from drug shops such as paracetamol blood tonics, anti-malarials (quinine, coartem). Other home remedies were tepid sponging in cold water, the use of traditional remedies such as fever grass, manyanga and some herbal preparations (concoctions and purgatives). Thus this implies that home treatment is still a common practice for treatment of malaria in this study area.

To effectively reduce malaria morbidity and mortality in children, treatment seeking behaviour is one of the primary issues that must be addressed. Delay in seeking treatment at the appropriate health facility might result in the progression of the disease to its complicated form, finally resulting to death.

Conclusion

This study is the first epidemiologic study on childhood malaria in the area and it adds to the existing data on malaria in Cameroon and Sub-Saharan Africa as a whole. Caregivers had a good knowledge of malaria (including its aetiologic agent, signs and symptoms and preventive measures). They also had a good practice towards preventive measures. However, the prevalence of malaria in under-five was high and only a lesser majority of caregivers sought treatment at the health facility in a timely manner.

In the past decades, as never before, it has been widely recognised that malaria control needs a holistic approach, based on the interaction of many disciplines (Brown, 1999). Within this context, studies on treatment-seeking play a vital role for the success of control programmes. As Oaks, *et al.* (1991) stated, "it is the behaviour of individuals and groups that determines how or whether efforts to prevent or treat malaria will be successful".

Recommendations

- Since as good knowledge on malaria was found to increase treatment seeking behaviour, we recommend that awareness campaign should be made intensified on the use of mosquito bed nets and in particular on early and appropriate treatment of malaria especially in children under-five, the most vulnerable.
- We also recommend further studies on the factors associated with treatment seeking behaviour in this area. Treatment-seeking needs to be regarded in a broader context, which includes people's real life situations economic constraints of coping with treatment costs, in connection with mobilisation of social networks, resource-seeking strategies, gender-related aspects and seasonality.
- Provided that financial constraint is often a factor to seeking treatment in most African settings, the ministry of public health should ensure a regular and constant supply of free treatment for children under five. Also the community should be sensitised on the free treatment of malaria in children under five.

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