SYMPTOMS ASSOCIATED IN THE DIAGNOSIS AND MANAGEMENT OF MALARIA IN A SEMI URBAN TROPICAL COMMUNITY

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ABSTRACT

A study of symptoms associated in the diagnosis and management of malaria in a semi urban community of Enugu State, South-Eastern Nigeria was conducted. Structured qualitative and quantitative questionnaires were administered along an in-depth interview to assess the knowledge, attitude, behaviour and practice (KABP) among school children and pregnant women attending ante-natal clinic hospitals and to ascertain their health-seeking behaviour. Symptomatic diagnosis of the 352 pregnant women and children, showed that 260 (79%) did not manifest any of the malarial symptoms within the past three months as at the time of the study, 20 (5.7%) patients had fever alone, chill and blisters (0.9%), headache, diarrhoea and joint pain (0.3%), and weakness and anorexia (0.6%), respectively. Recent fever combined with chill was highest 2.8%, followed by anorexia and weakness 2.0%, fever with headache, and weakness 1.7%, fever with anorexia and or vomiting 1.4%, fever with chill and headache and/ or amber urine or joint pain or anorexia or frequent sleeping 1.1%, headache with weakness 1.1%. Forty six (46) antenatal care patients out of the 352 population sampled for symptomatic diagnosis to predict malaria infection in symptomatic patients with recent history of treatment showed low sensitivity (41.6%), but highly specific (80%), low positive value (45.7%), high negative predictive value (77.3%), low false positive rate (20%), moderately high false negative rate (58.4%) and a high J-index (78.7%). The axillary temperature was poorly predictive for negative samples with normal axillary temperatures. The mean axillary temperature among children with positive malaria test was 37.0°C and negative malaria test was 36.4°C. Antenatal patients with positive test were 36.5°C and negative malaria test was 35.1°C. Self-diagnosis and presumptive treatment are evident based in the prevention and prompt treatment of malaria disease and this method is prevalent in the rural communities and should be an adjunct to routine microscopy in clinical diagnosis.

Keywords: Malarial symptoms, Anorexia, Diagnostic, Axillary, Sensitivity and predictive value

INTRODUCTION

Malaria morbidity and mortality is a global challenge upon the health and socio-economic development in the tropics. The fight against malaria is not achieving expected results due to lack of comprehensive knowledge and skills on malaria prevention, curative and management strategies across the general populations,

especially in the poor and remote areas with stable malaria transmission.

Malaria kills an estimated global population of 3 million people annually, and weaken 300 – 500 million more, mostly in Sub-Saharan Africa, Children under five years and pregnant women are the most vulnerable (WHO, 2000 a). The burden of malaria in Africa is particularly dangerous, causing 900,000 deaths, and every 30 seconds an African Child dies (WHO, 2000 b). Everyday, at least 1000 Africans dies of malaria and at least 20 % of all are children under five.

The disease causes widespread premature death and suffering, imposes financial hardship on poor households, retards economic growth and undermines living standards. Malaria is implicated for additional illnesses such as, cerebral malaria, respiratory infections, diarrhoeal diseases, iron-deficiency anaemia and malnutrition. The economic burden of malaria for households can be extremely high. It is responsible for the majority of poor academic performances and absenteeism among students and teachers. Treatment with anti-malarial and insecticidal are very expensive and is currently posing great challenge to interventions, considering the increasing reported cases of malaria relapses and drug resistances.

Prompt and effective treatment of all children with malaria is a critical element of malaria control. People who become ill with the disease need prompt and effective treatment to prevent the development of severe manifestations and death (WHO, 2003). Early treatment depends upon prompt recognition of symptoms and signs of malaria in the household, mainly by women. The success of this strategy depends on the behaviour of patients and caretakers of young children and it has been documented that treatment seeking behaviour is related to cultural beliefs about the cause and cure of illness (Bledsoe and Goubaud, 1985). In some cases, illnesses are seen as amenable to treatment by modern practitioners, while others are considered best treated by traditional healers (Press, 1980). Illness ideas and behaviours may enhance or interfere with the effectiveness of control measures (Klein *et al.,* 1995). An understanding of communities' beliefs and behaviours is therefore crucial to the success of a specific control measure. This study aims to ascertain the current perception of cause and treatment seeking practices of caretakers in a rural area in order to identify probable areas of intervention for the control of malaria in the under-fives.

Malaria risk and disease burden is owed to the following factors including poor housing, lack of education, increased exposure to mosquito bites, high household medical costs, reduced ability to pay for treatment, and unequal access to healthcare services so on (Bates *et al.,* 2004; Chuma *et al.,* 2006; Ekpeyong and Eyo, 2006). Decisions for prevention or treatment are made depending on economic ability of the household, perceived susceptibility and assessment of consequences. Furthermore, malaria transmission is often facilitated because environmental degradation, poor drainage and clearing of vegetation readily promote the proliferation of mosquito species such as *Anopheles gambiae* which propagates itself in sunlit, transient water bodies, notably artificial habitats associated with human activities (Fillinger *et al.,* 2004; Minakawa *et al.,* 2005; Munga *et al.,* 2006; Mushinzimana, *et al.,* 2006; Mutuku *et al.,* 2006; Ekpeyong and Eyo, 2008). Malaria, poverty and environmental change are inextricably linked and remain closely associated across most of Africa (Lindsay and Birley, 2004).

Community leaders, public health workers and representatives of various organizations working on health-related issues in the area have identified a great need for training and access to up-to-date information and technical support (Mukabana *et al.,* 2006). Rural areas have always been a major challenge for disease control worldwide, but the involvement and active participation of communities has been identified as a key factor for success in these environments (Kitron and Spielman, 1989; Brieger, 1996; Townson *et al.,* 2005; Van den and Knols, 2006; Mukabana *et al*., 2006). Malaria remains robustly endemic in most rural communities of Sub Sahara Africa, thus the central aim of the Roll Back Malaria Partnership (RBMP) is to strengthen the local

capacities of communities to identify malaria as one of their main health problems and then take the lead in developing and implementing solutions to these problems in partnership with different actors such as non-governmental organizations providing organizational support and research institutions acting as technical consultants (Manderson, 1992; Brieger, 1996; Williams and Jones, 2004; RBM, 2005; Mukabana *et al.,* 2006). In the past, malaria was predominantly viewed only as a biomedical problem; however, successful disease control at the community level needs to take the human behaviour, socio-cultural and economic context into account in order to successfully impact the disease through active participation and changing of risk behaviours (Sornmani, 1992; Williams and Jones 2004). These factors, together with the experienced obstacles of earlier vertical, top-down malaria eradication programs have contributed to the current emphasis on community-based malaria management strategies (Kroeger *et al.,* 1996; Williams and Jones, 2004). Although, considerable difficulties have been reported in conducting community-based disease control (Kidson, 1992), there is a large evidence base where such horizontal approaches have been successful because of a true partnership between the community and programme staff. Key elements of these programmes are the generation of a feeling of empowerment, local ownership and responsibility (Brieger, 1996; Kay and Vu, 2005) and the application of action-oriented and participatory approaches (Manderson, 1992; Onyango-Ouma, 2005). In the light of the above, a study of symptoms associated in the diagnosis and management of malaria in a semi urban community of Enugu State, South-Eastern Nigeria, was conducted as a means of providing base-line data require for the management of malaria globally.

MATERIALS AND METHODS

Study Area: The area of study was Affa, a semi urban community in Udi Local Government Area of Enugu State. The economy of the Affa people is based on semi-subsistence agriculture. It has one of the largest population and land mass with 58,000 people living in scattered small farms and villages. A total of 352 subjects were sampled comprising of primary school children aged between (6 and 17) years and pregnant women attending ante-natal clinic.

The study was conducted between August and December, 2007. The study sites were mapped using the Ach-GIS global positioning system (GPS) instrument as follows: Amofia-Agu Dispensary, Affa (Longitude 7.25117 East and Latitude 6.56483 North), Affa Health Centre, Affa (Longitude 7.32474 East and Latitude 6.60107 North) and Cottage Hospital, Affa. A cross-sectional study of the target populations was done using a systematic random sampling technique (Peterson index).

Ethical Approval: Ethical approval for the study was obtained from the Ministry of Health, Enugu State. At each study site, participation was voluntary and verbal informed consent sought from the subjects and from the Parent/Guardians of the children to be investigated, before an individual was recruited into the study. All sampled data and the research documents were guided with utmost confidentiality.

Diagnosis: The symptomatic diagnosis of malaria was based on the presence of fever (axillary temperature > 37.5°C) at the time of presentation to the health facilities or within the previous 48 hours, coupled with interview of the recent malarial history of the subjects. Symptoms associated with malaria such as fever (F), chill (C), amber urine (U) anorexia (A), frequent sleeping (S), vomiting (V), blisters, weakness (W) headache (H) and joint pain (J) were checked and recorded.

RESULTS AND DISCUSSION

Symptomatic diagnosis of the 352 pregnant women and children, showed that 260 (79%) did not manifest any of the above symptoms within the past three months as at the time of the study, 20 patients had recent fever alone highest at(5.7%), chill and blisters 0.9% each, headache, diarrhoea and joint pain 0.3% each, weakness and anorexia 0.6% each.

Table 1: Symptoms associated in the diagnosis and management of malaria in a semi urban tropical community in Enugu State, Nigeria

Symptoms	Frequency	Percentage (%)
No symptom	260	73.9
Fever	20	5.7
Chill	3	0.9
Headache	1	0.3
Anorexia	2	0.6
joint pain	1	0.3
Weakness	2	0.6
Diarrhoea	1	0.3
Blisters on the lips of the mouth	3	0.9
Fever + Chill	10	2.8
Fever + Headache	2	0.6
Fever + Headache + Chill	3	0.9
Fever + Headache + Chill + Amber Urine	4	1.1
Headache + Fever + Weakness + Amber Urine	2	0.6
Fever + Anorexia + Vomiting	5	1.4
Joint pain + Weakness	3	0.9
Headache + Weakness	4	1.1
Fever + Chill + Headache + Blister + Anorexia + Vomiting	1	0.3
Fever + Chill + Joint pain + Frequent sleeping	4	1.1
Fever + Joint pain	4	1.1
Fever+ Chill + Headache + Anorexia + Joint pain	4	1.1
Fever + Headache + Blister + Weakness	6	1.7
Anorexia + Weakness	7	2.0
Total	352	100.0

Table 2: Sensitivity, specificities and negative predictive values and positive likelihood ratio recorded for the symptomatic malaria diagnostic test in the health facilities studied

Type	Subject No	Sensitivity (%)	Specificity (%)	Predictive Value (%)		FPR (%)	FNR (%)	J-index (%)
				Positive	Negative			
Symptoms	46	41.6	80.0	45.7	77.3	20.0	58.4	78.7

FPR = false positive rate, FNR = false negative rate, J-index = the overall measure of reliability of a diagnostic test, which summarizes the sensitivity and specificity.

Fever combined with chill was highest (2.8%), followed by anorexia and weakness (2.0%), fever with headache and weakness (1.7%), fever with anorexia and or vomiting (1.4%), fever with chill and headache and or amber urine or joint pain or anorexia or frequent sleeping 1.1%, headache with weakness 1.1% (Table 1). Forty six (46) antenatal care patients out of the 352 population sampled for symptomatic diagnosis to predict malaria infection in symptomatic patients with recent history of treatment showed low sensitivity (41.6%), but highly specific (80%), low positive value (45.7%), high negative predictive value

(77.3%), low false positive rate (20%), moderately high false negative rate (58.4%) and a high J-index (78.7%) (Table 2). The axillary temperature was poorly predictive for negative samples with normal axillary temperatures. The mean axillary temperature among children with Acon-Pf positive at (37.0°C) and Acon-*Pf* negative at (36.4°C), antenatal patients with Acon-Pf positive at (36.5°C) and antenatal patients with Acon-Pf negative at (35.1°C).

The asymptomatic stage does not automatically indicate that one has no malaria infection. In this same vein, blisters on the lips of the mouth alone can not indicate malaria, all the major symptoms – fever, chill, headache, anorexia and joint pain are indicators of malaria infection (Manderson, 1992). However, blood test using rapid malaria diagnostic test kits and routine microscopy can only indicate infection proper. This is because other infections present similar symptoms like malaria infection (Fillinger *et al.,* 2004; Minakawa *et al.,* 2005; Munga *et al.,* 2006; Mushinzimana, *et al.,* 2006; Mutuku *et al.,* 2006; Ekpeyong and Eyo, 2008). In the remote and endemic areas of the study, the accuracy of symptom-based diagnosis was poor, as it has been reported by other researchers although specificity in this self-referring sick population should be higher than in the communities as a whole. Local transmission rates, and therefore immunity, were low, and this should have increased the symptomatic malaria sensitivity. The observation of fever alone, and/or fever in combination with chills and/or headache, achieved quite high sensitivities, but both criteria resulted in high rate of over-treatment in symptomatic patients. Any narrower combination of symptoms resulted in sensitivities unacceptable in relation to the detection of a life-threatening illness (Kroeger *et al.,* 1996; Williams and Jones, 2004). The measurement of axillary temperature failed to achieve sufficient sensitivity or specificity to be useful. The data on symptomatic malaria diagnosis shows that children may have higher axillary temperature than adult antenatal patients; reason may be because adults have developed asymptomatic immunity to malaria due to repeated exposure to malaria infection (WHO, 2000 a b). This study suggested that the symptoms identified can be used as an algorithm for the future identification of symptomatic malaria diagnosis for presumptive treatment in remote and malaria endemic regions.

The attitude of the antenatal patients to diagnosis during the study demonstrated the importance of providing patients with a reliable explanation for their illness. The responses of the rural community members and antenatal women suggested that there is an improved treatment-seeking behaviour and drug compliance. A rapid blood-based diagnosis at some cost was preferred by rural community members and antenatal patients to both the delayed free slide diagnosis and symptom-based diagnosis, despite the cost to the patient.

Conclusion: Culturally sensitive but evidence-based education interventions, utilizing participatory tools, are urgently required which consider traditional beliefs and enable understanding of causal connections between mosquito ecology, parasite transmission and the diagnosis, treatment and prevention of disease. Community-based organizations and schools need to be equipped with knowledge through partnerships with national and international research and tertiary education institutions so that evidence-based research can be applied at the grassroots level.

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