



Research Journal of
Parasitology

ISSN 1816-4943



Academic
Journals Inc.

www.academicjournals.com

Community Perceptions about Malaria, Mosquito and Insecticide Treated Nets in a Rural Community of the Niger Delta Nigeria: Implications for Control

¹I.G. Ukpong, ²K.N. Opara, ³L.P.E. Usip and ⁴F.S. Ekpu

¹Department of Animal and Environmental Biology, University of Port Harcourt, Port Harcourt, Nigeria

²Department of Zoology, University of Uyo, Uyo, Nigeria

³Department of Fisheries and Aquaculture,

⁴Department of Physical and Health Education, University of Uyo, Uyo, Nigeria

Abstract: Prior to an exploratory study on the acceptance and use of insecticide treated nets (ITNs), in a rural community of Akwa Ibom State, Nigeria, the people's knowledge, attitudes and perceptions about malaria, the vector (mosquito) and bednets were assessed. A total of 359 randomly selected individuals were interviewed between January and August, 2001 using qualitative and quantitative methods. People's knowledge about signs and symptoms was found to be very poor. The most frequently mentioned symptoms of malaria, reported by 40 and 31% of the study population are fever and body pains respectively. About 70% of the respondents knew that malaria is caused through mosquito bites, the rest attributed it to many other causes. Knowledge about causes and transmission of malaria is still shrouded in a lot of misconceptions. Mosquitoes are thought to bite persons at night (75.2%), breed in stagnant water (47.6%) and rest in dark places inside houses during the daytime (51.5%). Malaria was believed to be preventable by 96.4% of the respondents. Of those number that believed it could be prevented, 35.8% mentioned use of drugs, 30.5% reported netting of windows and doors with mosquito nets, 16.8% indicated elimination of breeding sites, while 3.2% mentioned burning of herbs and mosquito coils as preventive measures. The use of bednets was uncommon in the study community, although 37.3% of the study group claimed they have seen a bednet before, however none of them have owned one or slept under it. Remarkably, none of the study population has ever heard or seen an insecticide treated bednet. However, 78.8% of the respondents are willing to sleep under it if provided for. The study emphasizes the importance of the promotion of ITN acquisition, effective utilisation and sustenance as a barrier to the nuisance caused by mosquito and other insects of public health importance. Health education, advocacy, awareness creation, motivation and mobilization of the endemic communities to be involved in the Roll back malaria programme is highly recommended.

Key words: Malaria, community perceptions, bednets, mosquito, Nigeria

INTRODUCTION

Malaria constitutes a major public health problem globally (WHO, 2000) about 93% of the 550 million people living in Africa are at risk of malaria infection (WHO, 1995). The disease represents one of the major causes of morbidity and mortality throughout Nigeria, where it is

Corresponding Author: Dr. K.N. Opara, Department of Zoology, University of Uyo, Nigeria

holoendemic in status (Salako, 1986; FMOH, 1989). In Akwa Ibom State, Nigeria, malaria is responsible for one in four child deaths and poses a great economic burden on household and government (AKMOH, 2000; Opara *et al.*, 2004). It is also a major cause of maternal death, abortion, stillbirth, premature delivery and anaemia (FMOH, 1989; Opara *et al.*, 2004).

Community perceptions relating to causation, transmission, prevention and treatment are the main socio-cultural factors that can influence malaria control (Agyepong, 1992). The success of malaria control programmes at present relies on community perceptions of the disease; incorrect beliefs or inappropriate behaviour can interfere with the effectiveness of a control measure such as vector control or chemotherapy (Deressa *et al.*, 2002). These issues are particularly important in tropical areas where malaria control options are limited because of the parasite and vector resistance to antimalarial drugs and insecticides, respectively. For the participation of the community to be meaningful the views of the community should be sought and incorporated into any control programme.

With the widespread resistance to chloroquine, other antimalarial drugs and the bleak prospects for a vaccine in the future (Neville *et al.*, 1996; UNICEF, 2000), the most available option in the fight against malaria is the development and application of new and existing control measures to check man-vector contact. The current strategy is the promotion and use of insecticide treated mosquito nets (ITNs), a device known to have caused dramatic reduction in community malaria cases and 25% reduction in child mortality (UNICEF, 2000).

There has been a considerable number of studies about the knowledge, attitudes and practices (KAP) relating to malaria in different parts of the world (Ongore *et al.*, 1989; Afolabi, 1996; Ahorlu *et al.*, 1997; Miguel *et al.*, 1999; Kyawtt-swe and Pearson, 2004; Tyagi *et al.*, 2005). Most of these studies on KAP survey indicate that misconceptions concerning malaria still exist and practices for the control of malaria have been unsatisfactory (Kyawtt-swe and Pearson, 2004). Even though a lot of work has been done on KAP, no studies have been reported in the rural communities of the Niger Delta, Nigeria. The present study was undertaken to collect baseline data relating to knowledge, attitude and practice about malaria and bednets in a rural community of the Niger Delta (Akwa Ibom State), Nigeria. This was done prior to the introduction of insecticide treated bednets for malaria control. Better understanding of people's perceptions of malaria and its perceived cause, preventive action and value attached to ITNs are needed for planning bednet programmes (Winch *et al.*, 1997; Binka and Adongo, 1997).

MATERIALS AND METHODS

Study Area

The study was carried out between January and September, 2001, in Afaha Obo Ata Essien Community of Ukanafun Local Government Area of Akwa Ibom State, Nigeria. Akwa Ibom State is one of the 9 states in the Niger Delta, Nigeria. The state is located within the lowland coastal plains of Nigeria between latitudes 4°32' and 5°53' North and longitudes 7°25' and 8°25' East. The State shares the hot humid tropical climate of the Niger Delta marked by two distinct seasons namely, the dry season (November to March) and wet season (April to October). The mean annual rainfall is 3,500 mm, temperature ranges between 23 and 31°C and relative humidity is over 85%. The warm humid climate, poorly drained soil type and topography create conducive environment for mosquito breeding and proliferation (AKMOH, 2000; Ukpogon, 2005). The main occupations of the people are farming and trading. The settlement pattern in the study area is akin to the traditional extended family system in Southern Nigeria with households being the unit of settlement within a compound. The village head is the custodian of traditional authority in the community. Afaha Obo Ata Essien Community is surrounded by bushes, gardens, cultivated and uncultivated farmlands close to dwelling houses. Crops like cocoyam, banana, plantain and pineapple, which have implications on vector population are readily cultivated.

Study Design

An integrated approach, which employs both quantitative and qualitative research methodologies was used for both data collection and the analysis of knowledge, attitudes and practices about malaria in the study population. Focus Group Discussions (FGDs) and indepth-interviews were held among community members with the intention of using the results to develop a questionnaire that would be administered to the local population during the survey. Six (FGDs) were held in the community with 5-6 participants in each group. The purpose was to explore the knowledge, beliefs and practices of the community members about malaria and insecticide treated nets, using an FGD guide. In-depth interviews were held with political and opinion leaders, village head, Local Government Council and community health workers. All interviews were conducted in the local dialect (Annang) by trained field assistants under strict supervision and guidance.

Quantitative information was obtained using pre-tested structured closed questionnaires administered to 359 randomly selected subjects from the target population. The interview guide consisted of five sections: Identification; demographic data; knowledge, attitudes, practices and perceptions of malaria; perceptions and use of bednets.

Data Analysis

Quantitative data from completed structured questionnaires were checked manually for consistency and completeness by the supervisors. Data were entered into a computer using, EPI info version 6.04 (CDC, Atlanta, GA., USA) and analysed using SPSS Version 8.0 for Windows (SPSS Inc, Chicago, ILL, USA). Qualitative data from FGDs and in-depth-interviews were recorded, transcribed and analysed manually by content analysis.

Ethical Clearance

The Akwa Ibom State Ministry of Health reviewed and approved of the study. Informed consent was obtained from the Village Head and discussion was held with him and members of the Village Council to explain the research objectives and methodology. The villagers were subsequently sensitized and mobilized for the study.

RESULTS

Demographic Characteristics

A total of 359 people participated in the study, out of which 200 (55.7%) were males and 159 (44.3%) were females. Majority of the respondents had primary education (47.9%) and those with secondary education (33.1%), tertiary education (8.6%), while 10% of the study population are illiterate. About 23% of the respondents were farmers, students (22%), artisans (16.9%), traders (15.9%), public servants (4.2%) and fishermen (0.6%) (Table 1).

Awareness of Diseases in the Community

The common illnesses mentioned in the community are malaria (65.7%), skin rashes (11.7%), cough (10.5%), diarrhea (4.4%), cholera (1.9%), measles (0.6%), (Table 2).

Knowledge about Signs and Symptoms

About 40% of the study population associated malaria with fever, while other respondents associated it with joint and body pains (30.9%), headache (8.9%), coloured urine (8.4%), cold and shivering (6.4%), cough and catarrh (4.5%) and vomiting (3.3%), while 0.6% have no knowledge of the symptoms (Table 3).

Table 1: Demographic characteristics of the study population

Characteristics	No.	(%)
Age-range		
10-19	55	15.3
20-29	141	39.3
30-39	101	28.1
40-49	40	11.1
50+	22	6.1
Gender		
Male	200	55.7
Female	159	44.3
Education		
None	36	10.0
Primary	172	47.9
Secondary	119	33.1
Post-secondary	32	8.9
Occupations		
Students	109	30.4
Public servants	15	4.2
Farmers	115	32.0
Traders	57	15.9
Artisans	61	16.9
Fishermen	2	0.6

Table 2: Common illnesses in the study area described by the subject (n = 359)

Disease	Frequency	(%)
Malaria	236	65.7
Skin rashes	42	11.7
Cough	38	10.6
Diarrhoea	16	4.5
Cholera	7	1.9
Measles	2	0.6
Don't know	18	5.0

Table 3: Knowledge about the symptoms and causes of malaria in Afaha Obo Ata Essien Community of Akwa Ibom State, Nigeria (n = 359)

Variables	*Frequency (%)
Symptoms	
Fever	143 (40.0)
Headache	32 (8.9)
Vomiting	12 (3.3)
Joint and body pains	111 (30.9)
Convulsion	0 (0.0)
Coloured urine	30 (8.4)
Cold and shivering	23 (6.4)
Cough and catarrh	16 (4.5)
Don't know	2 (0.6)
Causes	
God's anger	0 (0.0)
Witchcraft	2 (0.6)
Ancestors curse	0 (0.0)
Sun shine	2 (0.6)
Bad weather	30 (8.4)
Contaminated food and water	48 (13.4)
Mosquito bite	250 (69.6)
Dirty habits	5 (1.4)
Heat	1 (1.3)
Don't know	5 (1.4)

* Multiple responses given by respondents

Knowledge about Cause

When the subjects were asked about the cause of malaria, majority of the respondent attributed it to mosquito (69.6%). Other responses were, eating contaminated food and water (13.4%), bad weather (8.4%), too much of sunshine (0.6%), dirty habits (1.4%), heat (1.3%) and witchcraft (0.6%) while (1.4%) claimed they do not know (Table 3).

Knowledge about Transmission

About 69% of the respondents knew that malaria is transmitted through the bite of an infected mosquito. Some misconceptions mentioned are drinking of contaminated water (21.4%), close contact with malaria patient (5.8%), eating contaminated food (2.8%), bad odour (1.1%), while 4.7% of the respondents do not know how malaria is transmitted (Table 4).

Biting Time, Breeding and Resting Sites

Mosquito is believed to bite persons at night (75.4%); (23.7%) of the respondents reported that it bites at anytime of the day, while 5.6% believed it bites during the day (Table 4).

When the subjects were asked about the breeding sites of mosquito, the following responses were reported: stagnant water (47.6%), rivers and streams (28.7%), bushes (20.6%) and grasses (6.1%), (Table 4).

Mosquitoes are mainly believed to rest in dark places inside houses (51.5%) on plants close to streams (27.3%), on refuse dumps (22.6%), while (3.6%) of the respondents have no idea about resting places of mosquito (Table 4).

Preventability and Preventive Measures

Table 5 shows the responses about malaria preventability and preventive measures. Malaria was believed to be preventable by 96.4% of the respondents, while 3.6% were of the opinion that it is not preventable. The preventive measures adopted were, use of drugs (35.8%), mosquito nets on windows and doors (30.3%), indoor insecticide spraying (21.7%), elimination of breeding sites (16.8%), burning of mosquito coils and herbs (3.2%).

Table 4: Knowledge and attitude regarding malaria transmission and the habits of mosquito vector (n = 359)

Variables	*Frequency (%)
Mode of transmission	
Bite of infective mosquito	248 (69.1)
Close contact with malaria patient	21 (5.8)
Drinking contaminated water	77 (21.4)
Eating contaminated food	10 (2.8)
Bad odour	4 (1.1)
Don't know	17 (4.7)
Biting time	
Day	20 (5.6)
Night	270 (75.2)
Any time	85 (23.7)
Breeding sites	
Stagnant water	171 (47.6)
Rivers and streams	103 (28.7)
Grasses	22 (6.1)
Bushes	74 (20.6)
Don't know	29 (8.1)
Resting sites	
Dark places	185 (51.5)
Plants close to streams	98 (27.3)
On reuse dumps	81 (22.6)
Don't know	13 (3.6)

* Multiple responses given by respondents

Table 5: Knowledge and attitudes about preventability and preventive measure of malaria (n = 359)

Variables	*Frequency (%)
Malaria is preventable	
Yes	346 (96.4)
No	13 (3.6)
Preventive measures	
Drugs	124 (35.8)
Insecticide spraying	75 (21.7)
Eliminating mosquito breeding sites	58 (16.8)
Mosquito nets on windows and doors	105 (30.3)
Burning mosquito coils	11 (3.2)
Burning of herbs and leaves	11 (3.2)

*Multiple responses given by respondent

Table 6: Knowledge and practices about treatment and use of bednets (n = 359)

Variables	*Frequency (%)
Treatment options	
Hospital	134 (37.3)
Patient medicine store	183 (51.0)
Herbs prepared by Herbalists	101 (28.1)
Prayers by pastors	14 (3.9)
Native doctors	8 (2.2)
Have you ever seen a bednet	
Yes	208 (57.9)
No	151 (42.1)
Have you used a bednet before	
Yes	0 (0.0)
No	208 (57.9)
Have you ever used an (ITNs)	
Yes	0 (0.0)
No	359 (100.0)
Would you like to sleep under an ITN to prevent mosquito bite	
Yes	283 (78.8)
No	76 (21.2)

*Multiple responses given by respondents

Treatment Seeking Behaviour

About 51% of the respondents visit patent medicine store for treatment, while (37.3%) visit the hospital, 28.1% of the respondents take herbs prepared for them by herbalists, 4% of the respondents visit their pastors for prayers, while 2.2% visit native doctors (Table 6).

Knowledge about Bednets

Knowledge about the use of bednets, is shown in Table 6; 57.9% of the respondents have seen a bed net before, while 42.1% have not seen one. Of the subjects that have seen a bednet, none had ever owned one or used it. All the subjects (100%) have not heard or seen an insecticide treated bednet (ITN). When asked whether they would like to own one and use it, 78.8% of the respondents were willing to own it, while 21.2% objected.

Information gathered from the FGDs shows that the people are quite aware about malaria in the community. It is generally known amongst the people by the local names Akom or uto anyen, Akom was the most common health problem affecting both children and adults. The villagers generally mentioned mosquito as an insect of great nuisance. They made reference to their bites, which results in skin swelling and local rash and the buzzing noise that disturbs sleep. One of the respondents' reaction is that: "Mosquito sucks blood and cause us to loose a lot of blood. The little blood I have is taken away by mosquito bites and I fall sick".

The subjects were conscious of the need to protect themselves against mosquito bites. The most common method mentioned was closing of door and windows in the evening hours. This shows that

the people are quite aware of the biting times of mosquitoes. The response from one of the respondents is; "I do not close my windows at night when sleeping because of heat, when I hear mosquito noise I kill them with hand or broom and cover up myself".

However locally practiced methods of mosquito control popular among the people were burning of leaves of *Ocimum gratissimum* locally called Nton, burning of dried peels of orange fruit and stalks of oil palm fruit (*Elaeis guineensis*). These produce smokes and fumes that repel mosquitoes. The use of mosquito coils and aerosol insecticides were also recorded, but it was not a common practice. Treatment of malaria illness in the community was mostly home-based, self-medication with drugs obtained from local drug stores. The main local herbal recipes for malaria are used as herbal bath, herbal drink and rectal enema. Herbal bath involves bathing of herbal mixtures of indigenous leaves, barks and roots of plants such as leaves and bark of mango (*Magnifera indica*), leaves and unripe fruits of Pawpaw (*Carica papaya*) and guava, leaves, bark and roots of wild plants, such as is lemon grass (*Cymbopogon citratus*) locally called (Ebanang Enang). This practice stems from the belief that malaria illness is caused by deposits of excess oil or fatty materials under the skin, which could be cleaned off as slurry waste during the bath for Akom or Uto anyen to be cured.

Herbal products are made from a variety of indigenous leaves, barks and roots as mixtures in water or local gin *kai kai* or *ufofop*. These are local ways of extractions of the active ingredients for added herbal potency. Plants such as utasi (*Gongronema latifolium*), lime fruit, lemon grass and leaves of the Neem tree locally called *dongoyaro* are often used. These are traditional ingredients and are sometimes mixed and administered by known native doctors or herbalists. Herbal enema involves the use of indigenous leaves for rectal enema. The leaves are boiled in water and the resulting mixture is introduced through the anus into the bowel using a rectal nozzle (for children) and a rectal catheter (for adults). This practice is locally referred to as *Ukebe*. It stems from the belief that when a person's bowel is dirty as a result of prolonged eating of oily and other kinds of food, it sets on the malaria illness. *Ukebe* is thus a traditional purgative practice to 'wash' the bowel.

There was no prior practice of bednet use in the village, even though most of the participants in FGDs have seen a bednet. Neither the participant in the FGDs nor respondent drawn from the study population have seen or heard about insecticide treated bednets.

DISCUSSION

Good knowledge of the behaviour of people, as well as that of epidemiology of malaria enhance correct prioritization of control strategies (Salako, 1999). Knowledge, Attitude and Practice (KAP) studies are therefore necessary to develop community-based interventions programme (Ukpong, 2005). Relatively high literacy level was recorded in the area. This and other socio-economic conditions are known determining factors in the attitude of households to this illness (Baribwira *et al.*, 1997). However, the noticed variations in occupational mainstay indicating the socio-economic status of the people suggest that public servants are more likely to show positive attitudes to treatment and control of malaria and other diseases.

The results showed that knowledge about the symptoms of malaria was low, even though people were able to recognize the common symptoms of malaria that include general body pains, fever, headache, coloured urine, cough and catarrh following their responses. Most of the participants were ignorant of the symptoms of the disease. Similar results have been published by Ongore *et al.* (1989) but in contrast with Deressa *et al.* (2002). There was abysmally low knowledge of the symptoms of complicated or severe malaria like persistent vomiting, convulsion and jaundice amongst the people. This might not be unrelated with people's belief that tends to link illnesses with such serious

manifestations as convulsion, with supernatural causes (Ahorlu *et al.*, 1997). The implication of this is that severe malaria was most likely to be mismanaged at home because of failure to recognize malaria early. This finding agrees with the report of Brieger *et al.* (1996) Afolabi (1996) Panda *et al.* (2000) and Kyawtt-swe and Pearson (2004). With regards to the cause of malaria, most of the study subjects implicated mosquito bites as the possible cause of malaria. This is consistent with the reports of Deressa *et al.* (2002) and Klein *et al.* (1995). The awareness in the present study is much higher than those reported for Central Ethiopia and Kenya by Yaneneh *et al.* (1993) and Ongore *et al.* (1989), respectively. With the recorded appreciable level of formal education, the varied responses in favour of causes other than mosquito bites obviously signify the influence of another factor on their disposition which might be their local environment. Such misconceptions represent a major obstacle to the acceptance of other vector control measures. Respondents were aware of many aspects of mosquito behaviour, such as biting during the night, breeding in stagnant water and resting in dark places inside houses. This is in agreement with the finding of Ongore *et al.* (1989), Matta *et al.* (2004) and Kyawtt-swe and Pearson (2004). By strengthening this knowledge, people may be convinced of the need to procure and use insecticide treated bednets and that ditches, pits and earthen pots around houses are potential sources for support of mosquito breeding. The health workers and opinion leaders in the community should encourage community members to level the ditches by simple earth work and constant changing of water in earthen pots.

Most of the respondents believed that malaria is preventable. This finding is similar to the report of Kyawatt-swe and Pearson (2004) Matta *et al.* (2004). Klein *et al.* (1995) but in contrast with the reports of Yaneneh *et al.* (1993) in Central Ethiopia. Most of the respondents in Ethiopia believed that malaria could not be prevented. The moderate level of education in that community might have informed this observation. In response to the nuisance problem of mosquitoes, this study community practice ineffective measures to reduce mosquito bites such as burning of herbs and mosquito coils. All these suggest their desire to prevent vector-man contact. However, the cost of other preventive measures such as aerosol insecticide spraying, netting of windows and doors made them to resort to the less effective but much cheaper preventive measures.

Most of the respondents believed in taking drugs whenever they have malaria. In the study community self-medication using drugs from local drug store is readily practiced. The dispensers of these drugs may give adulterated drugs or under-dose treatment resulting in the emergence of drug-resistant strains of the malaria parasites. It was also observed that the use of herb, in the treatment of malaria was a common practice. Prominent use of herbal treatment for malaria has been reported in some West African countries (Aikins *et al.*, 1994). Lack of adequate access to health centers and hospitals in most rural communities due to distance, cost and/or lack of transportation and long waiting time might be a contributory factor why respondents resort to patronizing local drug stores and herbalists (Hassouna, 1983; Igun, 1987).

The ownership and use of bednets was non-existent in the community. Also, all the members of the entire study population claimed that they have not heard about or seen an insecticide treated net before. This observation informed our introduction of insecticide treated bednets to the community. The outcome of this intervention is the subject matter for another research paper for publication elsewhere.

For the successful control of malaria, proper health education about the disease, causation, diagnosis, transmission, treatment and preventive measures should be imparted to, members of the community. Furthermore the role of home-management and local drug stores in the treatment and management of malaria should be recognized and incorporated into existing control programme of activities. In this regard community involvement must be emphasized and sustained.

REFERENCES

- Afolabi, B.M., 1996. Knowledge, Attitude and Practice of malaria in an Isolated community of the Atlantic Coast of Lagos, Nigeria. *Malar. Infect. Dis. Africa*, 4: 6-13.
- Agyepong, I.A., 1992. Malaria: Ethnomedical perceptions and practice in an Adangbe farming community and implications for control. *Soc. Sci. Med.*, 35: 131-137.
- Ahorlu, C.K., Dunyosk, E.A. Afari, K.A. Koram and R.K. Nkurumah, 1997. Malaria related beliefs and behaviour in Southern Ghana implications for treatment, prevention and control. *Trop. Med. Int. Health*, 2: 488-499.
- Aikins, M.K., H. Pickering and B.M. Greenwood, 1994. Attitudes, to malaria, traditional practice and bednets (mosquito nets) as vector control measures. A comparative study in five West African countries. *J. Trop. Med. Hyg.*, 97: 81-86.
- AKMOH., 2000. Resume of Activities: Malaria and Vector Control-Akwa Ibom State Ministry of Health. Nigeria.
- AKMOH., 2001. Keynote Address at the training workshop on Roll Back Malaria for Local Government Programme Managers, Akwa Ibom Stat, Ministry of Health Nigeria.
- Baribwira, C., L. Kanyange and M. Barntwanayo, 1997. The management of malaria and its vector. Knowledge and practices in households in Urban Areas of Bujumbura (Burundi). *Malar. Infect. Dis. Africa*, 3: 13-19.
- Binka, F.N. and P. Adongo, 1997. Acceptability and use of insecticide-impregnated Bed nets in Northern Ghana. *Trop. Med. Int. Health*, 2: 499-507.
- Brieger, W.R., A.E. Onyido, J.D. Sexton, V.I. Eziko, J.G. Breman and O.J. Ekanem, 1996. Monitoring Community response to malaria control at Nsukka Nigeria. *Int. Qrt. Com. Health. Educ.*, 16: 47-61.
- Deressa, W. and A. Ali, Enquoselassie, 2002. Knowledge Attitude and practice about malaria the mosquito and antimalarial drugs in a rural community. *Ethrop J. Health Dev.*, 17: 99-104.
- FMOH., 1989. Guildelines for malaria control in Nigeria.
- Hassouna, W.A., 1983. Reaching the people: A three country study of health systems. *World Health Forum*, 4: 57-62.
- Igun, U.A., 1987. Why we seek treatment here: Retail pharmacy and clinical practice in Maiduguri, Nigeria. *Soc. Sci. Med.*, 24: 689-695.
- Klein, R.E., S.C. Weller, R. Zeissig, F.O. Richards and U.T.K. Ruebush, 1995. Knowledge, beliefs and practices in relation to malaria transmission and vector control in Guatemala. *Am. J. Trop. Med. Hyg.*, 52: 383-388.
- Kyawtt-Swe, K. and A. Pearson, 2004. Knowledge, attitudes and practices with regard to malaria control in an endemic rural area of Myanmar. *South East Asian J. Trop. Med. Public Health*, 35: 53-62.
- Matta, S., A. Khokhar and T.R. Sachder, 2004. Assessment of knowledge about malaria among patients reported with fever a hospital-based study. *J. Vect. Borne Dis.*, 41: 27-31.
- Miguel, C.A., V.L. Tallo, L. Manderson and M.A. Lansang, 1999. Local Knowledge and treatment of malaria in Agusan del Sur. The Philippines. *Soc. Sci. Med.*, 48: 607-618.
- Neville, C.G., E.S. Some, V.O. Mungala, N.L. Mutemin and Marshk *et al.*, 1996. Insecticide treated bed nets reduce, mortality and severe morbidity from malaria among children on the Kenyan Coast. *Trop. Med. Int. Health*, 1: 139-146.
- Ongore, D., F. Kamunvi, R. Knight and AA. Minawa, 1989. A study of knowledge, attitudes and Practices (KAP) of a rural community on malaria and the mosquito vector. *East Afr. Med. J.*, 66: 79-89.

- Opara, K.N., E.S. Ibanga, N.B. Wali and L.P. Usip, 2004. Falciparum malaria and their susceptibility to genetic markers of pregnant women in Uyo, South Eastern Nigeria. *Afr. J. Applied Zool. Environ. Biol.*, 6: 58-64.
- Panda, R., L.J. Kanhkar and D.C. Jain, 2000. Knowledge, attitude and practice towards malaria in rural tribal Communities of Madhya Pradesh. *J. Comum. Dis.*, 32: 222-227.
- Salako, S.A., 1986. Malaria in Nigeria. In: Proceedings of the Conference on Malaria in Africa. Washington D.C. USA. Alfred, A. Buck (Ed.), American Institute of Biological Science. Eleventh Street N.W. Washington DC 2001, pp: 131-141.
- Salako, L.A., 1999. Malaria control priorities and constraints. *Parasitologia*, 41: 495-496.
- Tyagi, P., A. Roy and Malhotta, 2005. Knowledge, awareness and practices towards malaria in communities of rural, semi-rural and bordering areas of East Delhi (India). *J. Vect. Borne Dis.*, 42: 30-35.
- Ukpong, I.G., 2005. Application of Geographic Information System (GIS) and Insecticide-treated bednets (ITNs) in Community-Based control of malaria in Akwa Ibom State, Nigeria. Ph.D Thesis, University of Port Harcourt, Port Harcourt, Nigeria.
- UNICEF., 2000. Malaria Prevention and Treatment. The Prescriber 2000, UNICEF, New York.
- WHO., 1995. Vector Control for malaria and other mosquito-borne diseases. WHO Technical Report Series 857. World Health Organization, Switzerland.
- WHO., 2000. Malaria Drug Resistance, Gere Identifid. *Bull. World. Health Organisation* 78: 1467-1479.
- Winch, P.J., A.M. Makemba and V.R. Makame *et al.*, 1997. Social and Cultural Factors affecting rates of regular re-treatment of mosquito nets with insecticide in Bagamoyo District, Tanzania. *Trop. Med. Int. Health*, 2: 760-770.
- Yaneneh, H., Gyorkos, L. Joseph, J. Pickering and S. Tedla, 1993. Anti malaria drug utilization by women in Ethiopia a knowledge-attitude-practice study. *Bull. World Health Org.*, 71: 763-772.