



## Use of Artemisinin- Combination Therapies in Port Harcourt

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**ABSTRACT:** Malaria still constitutes a public health problem in Nigeria and it is the leading cause of morbidity and mortality in Sub-Saharan Africa. The emergence and spread of *Plasmodium falciparum* parasite resistance to commonly used antimalarials such as chloroquine and sulphadoxine/pyrimethamine has posed challenges to malaria control. The World Health Organization (WHO) recommends the use of Artemisinin- based combination therapies (ACTs) as the first line of treatment for malaria in Sub-Saharan Africa. This study was carried out to determine the pattern of use of ACTs in Port Harcourt so as to identify problems associated with ACTs use and to contribute to malaria control programme in the country. The parameters investigated include the demography, frequency of malaria attacks, place of treatment, mode of treatment and specific antimalarial drug treatment. A survey was conducted with the aid of structured questionnaires in Port Harcourt metropolis. Of the 717 questionnaires that were returned and evaluated, 690 (96.2%) respondents claimed to have had malaria within the last one year; 244 (34%) received treatment from hospitals; 273 (38.1%) received treatment from pharmacies; 137 (19.1%) engaged in self medication and 17 (2.4%) received herbal treatment. The respondents that took artemisinin based combination drugs were 230 (32.1%), those that took artesunate only were 174 (24.3%), those that took chloroquine were 101 (14.1%) while those that took sulphadoxine/pyrimethamine were 140 (19.5%) while 72 (10%) took other antimalarial drugs. This study suggests that a majority of respondents in the study area take ACTs for the treatment of malaria. @JASEM

**Keywords:** Artemisinin-based combination therapy (ACT), Malaria, Antimalarial

WHO estimates show that there are between 300 and 500 million cases of malaria each year, resulting in over one million deaths annually (Guinovart et al, 2006) . Forty percent of the world's population (approximately about two billion people) in 100 countries are at risk of the disease (WHO, 1993) and 90% of the cases of malaria occur in children in Africa under 5years of age . Other high -risk groups include HIV patients, non immune travelers, pregnant women, refugees and labour forces entering into endemic areas. Here in Nigeria, malaria still constitutes a serious public health problem. It is responsible for 60% outpatient visit to health facilities, 30% childhood deaths, 25% of death in children under one year and 11% of maternal death. In Nigeria, a child will be sick of malaria between two and four times in one year (FGN, 2004).

The aim of Roll Back Malaria to reduce the malaria mortality in African children by half by the year 2010 (Remme et al, 2001) received a major setback in the past years due to widespread resistance to commonly used antimalarial drugs such as chloroquine and sulphadoxine-pyrimethamine. Both the broad collapse of preventive efforts and the waning efficacy of standard antimalarial drugs account for the global resurgence of malaria (Band et al 2000, Guerin et al, 2002). In view of the above, the World Health Organization (WHO) recommends the use of artemisinin combination therapies (ACTs) as the first

line of treatment of malaria in Sub-Saharan Africa (WHO, 2001)

Drug utilization studies are carried out to identify problems associated with drug use since adherence to recommendations of treatment policy is key to the success of such treatment guidelines. Irrational use of medicines is a major problem worldwide. WHO estimates that more than half of all medicines are prescribed, dispensed, or sold inappropriately and that half of all patients fail to take them correctly (<http://mednet>, 2006). The overuse, underuse or misuse of medicines results in wastage of scarce resources and widespread resistance. Challenges exist in the deployment and use of antimalarial drug combination therapies especially in Africa due to compliance problems (Majori G, 2004).

In Nigeria today, data on antimalarial drug use is inadequate to influence policy on drug use..Oreagba et al, 2008 reported that despite the national policy change from chloroquine to ACTs as the first line antimalarial, the use of ACTs in the public secondary health facilities in Lagos state does not reflect this policy change and chloroquine still remained the choice antimalarial drug. This study aims to measure existing practices in the consumer use of antimalarial drugs in PortHarcourt, Rivers State. It seeks information on the knowledge, attitude and practices of consumers on the use of antimalarial drugs in order

to obtain information that will contribute to policy on antimalarial drug use in the country.

## MATERIALS AND METHODS

A descriptive cross sectional survey with the use of structured questionnaires was carried out to determine the pattern of use of antimalarial drugs among the residents of Port Harcourt metropolis, Rivers State, Nigeria. Nine hundred questionnaires were randomly distributed within the metropolis and 717(79.67%) responses were correctly filled and returned. Inclusion criteria were those respondents that have had malaria before and aged 15 years and above. The questionnaires covered the demographic information of respondents' knowledge of malaria symptoms, awareness of antimalarial drugs, sources of treatment and compliance to medication.

*Statistical Analysis:* All data were analyzed using the statistical package for social sciences, version 15 software package. Data analysis was done using descriptive statistics of the same software package.

## RESULTS

### Demographic characteristics

*Sex distribution:* The results show that 55.4% of the respondents were males; 44.1%, females and 0.6% did not indicate.

*Age:* Respondents (17%) were between ages of 15 to 20 years; 52.6%, between age of 21 to 30 years; 29.1% between 40 years and above while 1.3% gave no response.

*Education:* Of the respondents, 83.7% were graduates, 12.3% had secondary education and 4% had primary education.

*Knowledge of Symptoms of Malaria:* In response to the question on respondents' knowledge of malaria symptoms, 132 respondents (18.41%) said increased body temperature; 128 (17.85%), headache, 108 (15.06%) body weakness ; 98 (13.67%) body pains ,79 (11.02%), bitter taste ; 64(8.93%) loss of appetite ; 39 (5.44%) cough and catarrh and 69(9.62%) other symptoms such as vomiting, thirst and passage of yellowish urine as symptoms (Fig 1).

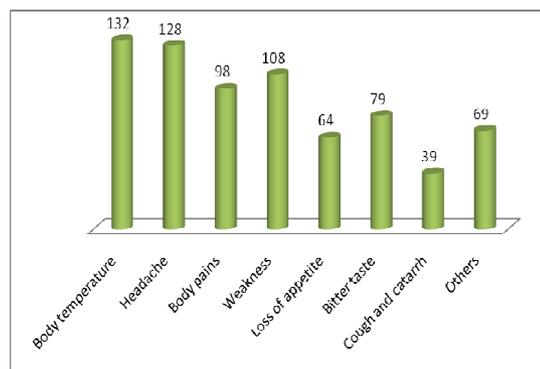


Fig. 1: Knowledge of Symptoms of Malaria by respondents

*Frequency of malaria infection:* The results show that 129 (18%) respondents developed malaria once in every two months; 163 (22.7%), once in every three months; 115 (17.3%), once within four to six months; 164 (22.9%) once a year; 110 (15.3%), longer than one year interval ; 27 (3.8%) did not respond (Fig 2).

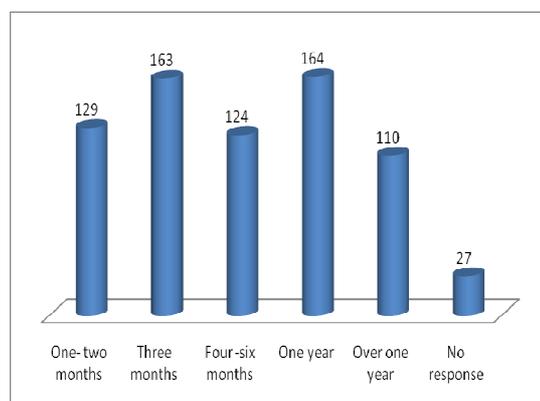
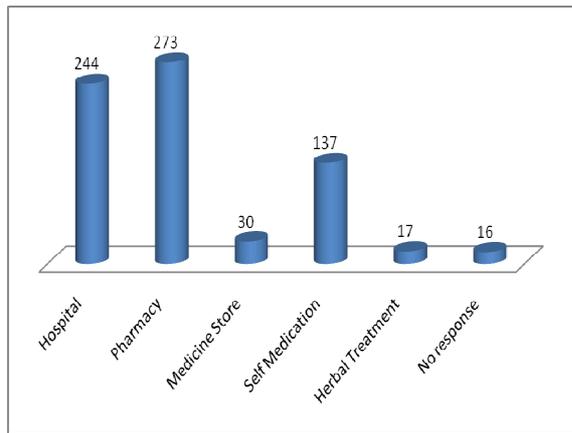


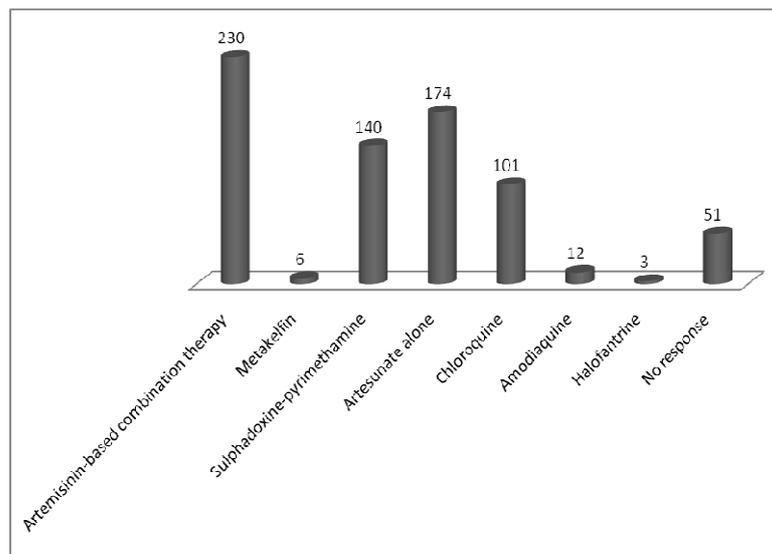
Fig. 2: Frequency of Malaria Infection by Respondents

*Place of treatment:* A majority of respondents, 273 (38.1%) received antimalarials treatment from pharmacies; 244 (34%) from hospitals; 17 (17%) from herbal treatment, 30 (4.1%) from patent medicine vendors and 137 (19.1%) engaged in self medication (Fig 3).



**Fig. 3:** Sources of Information on Antimalarial Drugs by Respondents

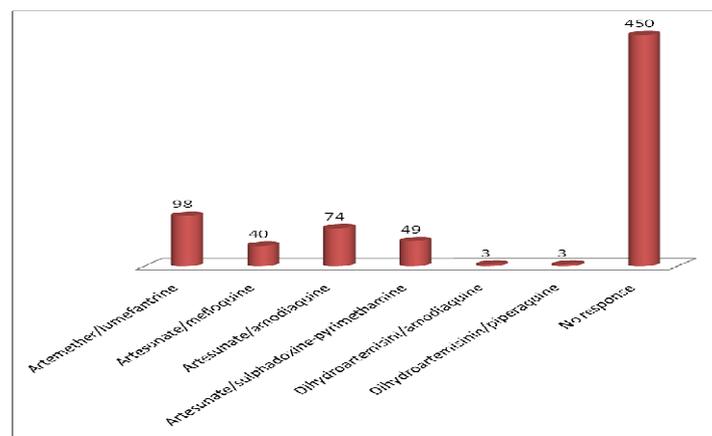
*Antimalarial Drugs Frequently Purchased:* Artemisinin-based combination drugs (ACTs) was the most frequently purchased by 230 (32.1%) of the respondents. This was followed by artesunate alone; 174 (24.3%); chloroquine, 101 (14.1%); sulphadoxine-pyrimethamine, 140 (19.1%); amodiaquine, 12 (1.7%); halofantrine, 3 (0.7%) and metakelfin, 6 (0.9%) (Fig 4).



**Fig. 4:** Profile of Antimalarial Drug Received by Respondents

*Specific ACTS purchased:* When asked about the antimalarial drug of preference, 98 (13.7%) respondents preferred artemether/lumefantrine; 74 (10.3%), artesunate/amodiaquine respondents ; artequine 40 (5.6%); 49 (6.8%)

artesunate/sulfadoxine-pyrimethamine; 3 (0.4%) dihydroartemisinin/amodiaquine, 3(0.4%) dihydroartemisinin/piperacquine and 436 ( 61.1 %) took other antimalarial drugs ( Fig 5).



**Fig. 5:** Specific Artemisinin-based Combination Drugs Received by Respondents

**Compliance to Dosage Regimen:** Respondents were asked if they took their antimalarial drugs as prescribed. The results show that 539 (75.2%) of respondents said they take their drugs well; 152 (21.2%) did not comply and 26 (3.6%) did not respond (Fig. 6).

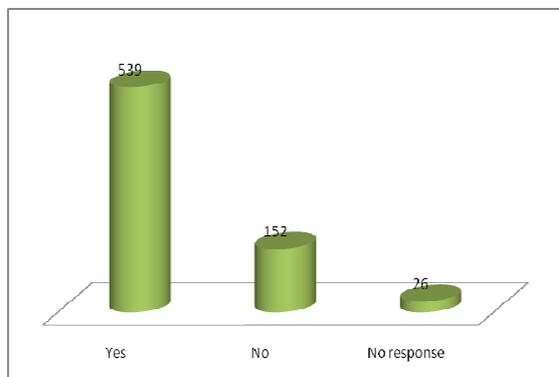


Fig. 6: Compliance with Dosage Regimen by Respondents

**Reasons for Non-compliance:** In giving the reasons why they did not comply with the specified dosage regimen, 82(11.9%) of the respondents said they experience adverse effects; 12 (1.7%) complained of frequency of drug administration; 17 (2.4%) could not afford the full dose of drug ; 30 (4.2%) said the length of time for drug dosage was long; 12 (1.7%) complained about the large size of some tablet, and 22 (3.1%) , the unpleasant taste of some of the drug (Fig 7).

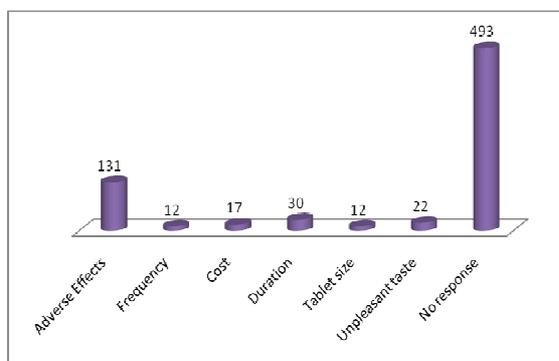


Fig. 7: Reasons for Non-compliance by Respondents to Drug Regimen

**Specific Adverse Effects:** The adverse effects reported by respondents include: dizziness, 100 (13.9%) respondents; headache, 36 (5.0%) respondents; itching, 27 (3.8%) respondents; and abdominal pain, 12 (1.7%) respondents (Fig 8).

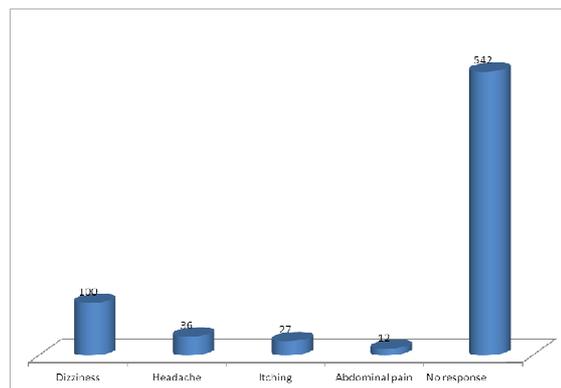


Fig. 8: Specific Adverse Effect Profile by Respondents

**Relapse of Malaria (Recrudescence):** Recrudescence of malaria occurred in 126 (17.6%) of the respondents within one month of treatment; 187(26.1%) within two months; 189 (24.4%) infection within three to six months; and 95 (13.2%) after a year or more (Fig 9).

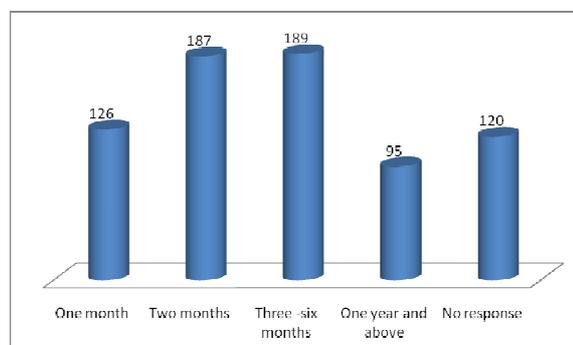


Fig. 9: Frequency of Time of Relapse of Malarial Infection by Respondents

## DISCUSSION

These results show that a majority of the respondents (91%) in this study have basic knowledge of the symptoms of malaria such as : increase in body temperature, headache, body weakness and body pains. The results also show that 129 (18%) respondents develop malaria; 163 (22.7%), once every three months; 115 (17.3%), once within four to six months; 164 (22.9%) once a year, 110 (15.3%), longer than one year interval and 27 (3.8%) did not respond.(Table 2). A good number of respondents (22.7%) reported having malaria once in every two months. This is not surprising since malaria is a serious public health problem in Nigeria and accounts for 20% of all hospital admissions, 30% of outpatient visits and 10% of hospital deaths (FMOH, 2005).

It is interesting to note that 38.1% of the respondents purchased drugs from pharmacies, 34% received

treatment from hospitals, and 4.1% purchased the antimalarials from patent medicine vendors while 19.1% engaged in self medication. In Nigeria, the public health clinics are frequently located some distances from the patients' home or work place and these clinics are open at certain hours. Once there, the patient usually encounters long queues to get a prescription if it is in stock. In contrast, private pharmacies or chemist shops are often located in high traffic areas, right around the corner or on the way to the work place. It therefore takes less time to get service from community pharmacists and patent medicine vendors. These vendors also provide friendly advice on the products they sell and usually have more medicines in stock even though they may be at higher costs than those from hospital pharmacies. Pharmacists by the virtue of their training do provide information, and they educate and counsel patients as regards the rational use of drugs.

It has been reported that, in countries like China, Tanzania and Guatemala as much as 80%-90% of the money spent on drugs goes to the private sector (World Health Report, 2004) Place of purchase could also influence the behavioural pattern of respondents to antimalarial drug use. Studies have revealed that the patent medicine seller's knowledge of drugs and doses is often poor (FGN, 2007). It has been observed that in Africa, unregistered shops like patent medicine shops are the main sources of antimalarial drugs (Omole et al).

The survey also revealed that artemisinin combination drugs (ACTs) were the most frequently purchased antimalarial drugs followed by artesunate monotherapy. These were followed by sulphadoxine/pyrimethamine (SP) then chloroquine (CQ). The results of this study are not in agreement with those of earlier studies in Nigeria which have shown a high percentage of monotherapy prescriptions with chloroquine, sulphadoxine/pyrimethamine and artemisinin derivatives alone being the commonest prescriptions (Ukwe et al, 2008; Meremikwu et al 2007; Oreagba et al, 2005) and from Ghana which showed that curative regimens containing an artemisinin derivative were given to 90.8% of patients, although 33% of patients received an artemisinin-based monotherapy (Dodo et al, 2009).

Majority of the respondents comply with the prescribed dosage of antimalarial drugs. This is good in that it will ensure effective therapy of the infection as well as delay the development of resistance. Inappropriate use or poor adherence to dosage regimen may lead to faster development of drug resistance to the ACTs. Reasons for the non-compliance among the respondents include adverse

effects, frequency of administration, cost, size of tablet and unpleasant taste. It has been reported that people with malaria episode are often the poor and low socio-economic class who cannot afford the best treatment for malaria (Oreagba et al, 2005), so they often do not have the financial means to purchase such highly effective antimalarial drugs. The specific adverse effects reported by the respondents were mainly dizziness, headache and abdominal discomfort.

The findings also showed that majority of the respondents reported that they had new infection within a period of two to six months. These new episodes, in most cases, are followed up by "presumptive" treatment. There is therefore the need for adequate education which will influence behavioural attitude to sensitizing the public on the use of antimalarials in terms of correct dosing, compliance factors, appropriate use of available antimalarials. This will help to avert drug misuse pattern and development of drug resistance.

*Conclusion:* This study showed an increase in the use of artemisinin based combination therapy for the treatment of uncomplicated malaria compared to previous reports in Nigeria. There is need for continuous monitoring of adherence to antimalarial treatment guidelines so as to achieve optimal therapeutic outcome. The correct use of antimalarial drug is the key not only to therapeutic success but also to deter the spread of resistance to antimalarial drugs. As most cases of malaria are treated within the community, it will be unavoidable that some patients will receive irrational treatment. Effective public education should be continuous so as to provide the public with a better understanding of the benefits and the potential dangers of inappropriate drug use.

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