

**MALARIA TREATMENT BY COMMUNITY PHARMACISTS IN PORT HARCOURT,
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ABSTRACT

Adherence to guidelines for the treatment of malaria is a very important key factor in effective control of malaria. Self-medication and high rates of treatment seeking in private sector are among the major challenges to malaria control because they contribute to the misuse and poor administration of antimalarial drug thereby increasing the possibility of increased drug resistance. A prospective, descriptive, cross sectional study was carried out to assess the malaria treatment and consumption of anti-malarial drugs in community pharmacies in Port-Harcourt between the months of December 2016 to January, 2017. Collected data include mode, pattern and cost of treatment, drugs used, and pharmacists' basis of choice of treatment. Results show that 81.1% of the pharmacists treated the malaria according to the national policy of testing before treatment as well as use of artemisinin combination therapy (ACT) based drugs. The most sold/recommended ACT was artemether-lumefantrine (78.2%) followed by dihydroartemisinin-piperazine (15.4%). Median cost for treating one episode of malaria inclusive of co-medications was ₦1, 250 (\$3.45). Sale of monotherapy and other non-ACT drugs was also observed from the study. Need for strict enforcement of national guidelines for malaria treatment is advocated.

KEY WORDS: Malaria, treatment, community pharmacists, guidelines.**INTRODUCTION**

The use of antimalarial drugs is one of the major means of malaria control in sub-Saharan Africa. Chloroquine remained the mainstay for malaria treatment in Africa from the 1950s up until the early 1970s^[1] when it became ineffective because of the development of resistance. As a result of this, several other efforts and strategies and other antimalarial drugs have been developed as part of the progress towards the elimination of malaria. The preventive and control measures for malaria which includes widespread use of insecticide-treated nets, awareness programmes and use of artemisinin-based combination therapies have received a significant scaling up in the last decade.^[2]

An important aspect of treatment of malaria as control measure is the individual case management which entails early diagnosis and prompt treatment using the recommended treatment plan.

Part of the challenge to the control of malaria in Nigeria is the indiscriminate use of antimalarial drugs due to high rates of treatment seeking in the private sector (pharmacies, drug vendors, shops). Other aspects that deter effective malarial control include availability of fake, substandard and adulterated products, weak public health systems, low economic status of the populace and

limited access to newer agents especially in rural communities.^[3,4]

The Federal Government of Nigeria adopted the use of Artemisinin based Combination Treatments (ACTs) adopted by Nigeria for the treatment of uncomplicated malaria and this has remained the best treatment for malaria globally. In line with the recommendation of the World Health Organization, the country has adopted the Test, Treat and Track (3T) strategy that all suspected cases of malaria properly diagnosed using Rapid Diagnostic Tests or microscopy, be treated promptly with recommended ACT if the result is positive and documented.^[5]

Malaria infection therefore continues to be a public health challenge in sub-Saharan Africa and Nigeria in particular where it has impacted very negatively not just on the health of the citizens but also economically since it has been deemed a deterrent to the socioeconomic growth of a country.^[6, 7]

Past studies have established that malaria treatment-seeking behaviour is more common in the private sector and most Nigerians first consult the private establishments before the public.^[8] This is also obtained in other countries such as Uganda where it has been

established that 59% of first consultations take place in the private sector.^[9] Therefore the study of treatment of malaria in the community pharmacists is very imperative. Community pharmacies usually serve as the first point of call for patients because the community pharmacists are the most accessible and widely distributed health professionals to the public. Their roles range from the traditional role of dispensing of prescription and non-prescription medicines to counselling, provision of effective medicine, drug information to the general public and patients as well health promotions.^[10] In this regard, patronage of community pharmacies is very common among many Nigerians especially in seeking advice for self-care and minor ailments. It is therefore very imperative to evaluate this practice with respect to malaria which is a very common ailment in the environment considering the holoendemicity. The study was aimed at evaluating malaria treatment by community pharmacists in Port Harcourt, Nigeria.

SUBJECTS AND METHODS

Study Area

The study was carried out in Port Harcourt, the capital of Rivers State, Nigeria. Port Harcourt is the capital of Rivers State in the Niger Delta region and it is rich in the Nation's oil and gas resources with a lot of industrialization. Port Harcourt exhibits lengthy and heavy rainy seasons and very short dry seasons with average temperatures between 25°C-28°C as a result of its mangrove swamp forest vegetation where transmission is year round.^[11] Annual rainfall in this area averages more than 3,550 millimeters in the Niger Delta. Malaria is holoendemic in Nigeria and the swampy nature of the area provides a good breeding ground for mosquitoes. Studies in the area have established a prevalence of 11.2 and 12.3% in the area.^[12, 13] Port Harcourt covers two local government areas namely, Obio-Akpor and Port Harcourt City local government.

STUDY DESIGN AND DATA COLLECTION

This was a prospective, descriptive, cross sectional study carried out to assess the malaria treatment and consumption of anti-malarial drugs in community pharmacies in Port-Harcourt. Community Pharmacies in Port Harcourt are grouped into 13 Zones with each zone consisting of about 8-34 Pharmacies. As at the time of the study, there were about 284 retail pharmacies. From each zone, convenient sampling was done to obtain the calculated sample size of 154 pharmacies. The study was carried out between December 2016 and January 2017.

Well-structured self-administered pre-tested questionnaires were used as instrument for the study to collect required information. One hundred and fifty (152) questionnaires comprising of 26 questions were distributed to community pharmacists who served as the

respondents in the study. A total 132 questionnaires were retrieved, giving a response rate of 86.8%. Information collected includes the socio-demography of the community pharmacists, pattern of treatment of malaria, most commonly antimalarial drug purchased or requested for by the clients, recommended by the pharmacists and basis of recommendation, cost of treatment of malaria, awareness of ACT use by the pharmacists. Also included were questions on counselling by the pharmacist and the response of the clients. The respondents were pre-informed and their willingness to participate in the study was obtained before commencing the study.

Community pharmacist in this study was defined as a pharmacist practising in a retail pharmacy outlet with the minimum BPharm degree or its equivalent as approved by the Pharmacists Council of Nigeria (PCN). Other qualifications were considered as additional degrees and were also included in the analysis. Data obtained were analysed using Statistical Package for Social Sciences (SPSS) version 20.0 SPSS Inc, Chicago, IL, USA), using descriptive analysis procedure. Results obtained were presented in frequencies, percentages and tables.

RESULTS

One hundred and fifty one (151) questionnaires were distributed however only 132 (87.4%) were retrieved. Age distribution of the pharmacists was between 25-59 years with a mean age of 33. About half (52.3%) were within the age range of 30-39 years. Seventy nine (59.8%) were males while fifty three (40.2%) were females (Male:female ratio of 1:1.5). The number of years of practice ranged between 1-35 years with a greater majority (41.7%) of them having 16-25 years of practice and only 6 (4.6%) had over 25 years' experience. Ninety five (72%) of the pharmacists have BPharm only, nineteen (14.4%) had PharmD and eighteen (13.6%) had MPharm (Table 1). Over 97% of the pharmacies were located in urban areas.

Variables	Parameters	Frequency	Percentages (%)
Gender	Male	79	59.8
	Female	53	40.2
Age group	20-29	28	21.2
	30-39	69	52.3
	40-49	32	24.2
	50-59	3	2.3
Qualifications	B.Pharm only	95	72
	Pharm.D	19	14.4
	M.Pharm	18	13.6
Year of practice	< 5 years	32	24.2
	5-15	39	29.5
	16-25	55	41.7
	26-35	6	4.6

Analysis of the results shows that the most commonly stocked antimalarial drugs are the ACT drugs presenting in four different combinations with about 30 different brands. Close observation showed that 10%, 63% and 27% of the community pharmacies stocked an average of 6-10, 11-20 and 21-30 brands respectively. The most

sold and most commonly recommended ACT drug is the artemether-lumefantrine (78.2%) in different brands (Fig.1), followed by dihydroartemisinin-piperaquine (DHA-PIP15.4%); artemether-amodiaquine (ART-AMQ 3.8%) and artemether-mefloquine (ART-MEF 2.6%).

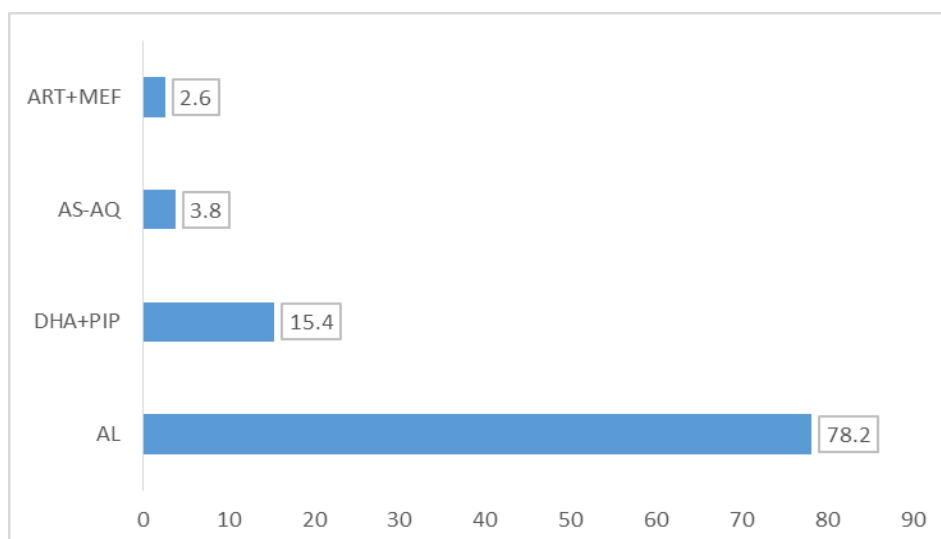


Fig. 1: Distribution of the ACTs according to the demand/sales.

Mode of treatment showed that none of the respondents gives antimalarial drugs based on patients' complaints alone. A large percentage 108 (81.8%) of the treatment was based on confirmatory diagnosis either by laboratory investigation (44.7%) or based on RDT test results (37.1%). This is in conformity to the WHO guideline of testing before treatment. Community pharmacists of younger age (<50 years) were more likely to adopt laboratory investigation before treatment than their older colleagues ($p=0.04$). The World Health Organization advocates the principle of test, treat and track for every malaria episode.^[13] However the tracking aspect of the policy is poorly adhered to as the follow-up aspect of the cases was just based on general assessment without testing to confirm parasite clearance. Nevertheless, a small number 24 (18.2%) treat malaria presumptively

based on the clinical symptoms of patients' situation or presentation at the time of consultation.

The choice of treatment pattern of the pharmacists were all ACT-based, however some individuals still purchase non-ACT antimalarial drugs contrary to the advice or recommendations of the pharmacists. Analysis of the results shows that younger pharmacists (30-39) were significantly more likely to prescribe ACTs for their clients compared to their older colleagues ($p=0.00$). However, in addition to the ACT drugs, all the community pharmacists stocked non-ACT and monotherapy drugs which included chloroquine, amodiaquine, mefloquine, artesunate and sulphadoxine-pyrimethamine (Fig 2).

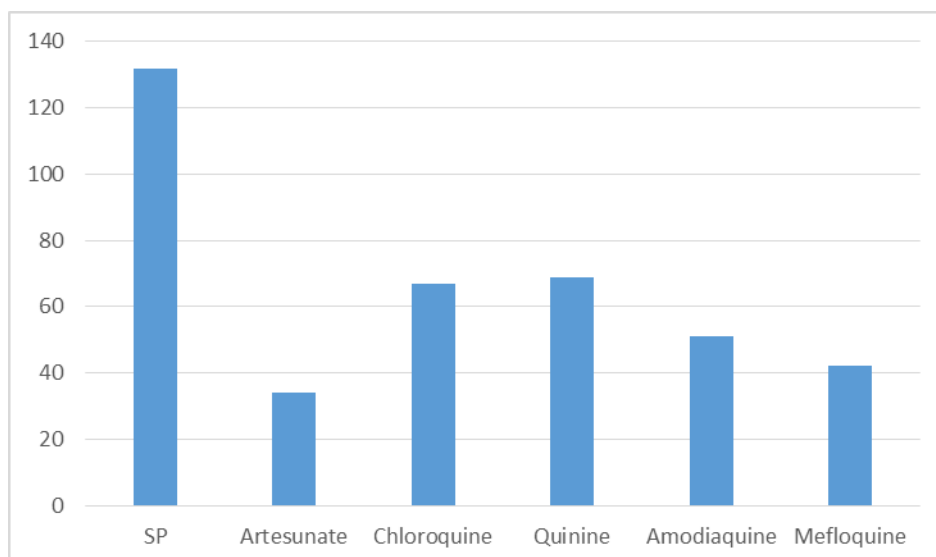


Fig. 2: Distribution of other antimalarial drugs sold in pharmacies.

Most of the community pharmacists recommended at least an additional drug in combination with the antimalarial drugs. Observation shows that 129 (97.7%) give analgesics while 113 (85.6%), 32 (24.2%) and 6 (4.5%) recommended antipyretics, multivitamin and antibiotics respectively. An average of three drugs were used per person.

The cost of treatment of malaria inclusive of co-medications in a community pharmacy was in the range of 500-2000 Nigerian Naira (\$1.38-\$5.53) at a median cost of \$3.45 for one episode of malaria. Results show that 75 (57%) of the community pharmacists treated malaria with ACT drugs at the cost of ₦500-1000 (\$1.38-2.76); 53 (40%) for ₦1000-2000 (\$2.76-5.53) while only 4 (3%) treated for < ₦500 (\$1.38) excluding the cost of laboratory investigation. This covers just the direct cost and does not include the cost of transportation and the indirect cost such as loss of income as result of the sickness.

DISCUSSION

Treatment of malaria among community pharmacists in Port Harcourt shows a similar trend among the respondents from the study. In consonance with both WHO and National Guidelines^[14, 5] on recommendations for confirmatory test using either RDT or microscopy for diagnosis, most community pharmacists are in compliance with the treatment pattern. Over 80% of the pharmacists make the recommendations for treatment of malaria after a confirmatory positive test either through laboratory (microscopy) test or RDT. This is very commendable, however the presumptive treatment of the remaining 18.2% should be discouraged since it has been established that this leads to incorrect management of fevers and complications as well as wastage of drugs.^[15]

The World Health Organization and the National Guidelines^[14, 5] advocate the use of ACT-based drugs for the treatment of uncomplicated malaria. Results obtained

confirm that the treatment pattern by the community pharmacists is in consonance with the recommended guidelines in the use of ACT-based antimalarial drugs. This is a great improvement when compared to earlier practices of just 3% treatment with ACT as reported by Meremikwu *et al.*,^[16] two years after the change in treatment policy.

Out of the 30 different brands of ACT-based drugs stocked by the different community pharmacies, artemether-lumefantrine (AL) was the most commonly stocked combination albeit with different brand names followed by DHA-PIP. This is in consonance with earlier studies^[17, 18] Artemether-lumefantrine was introduced in Nigeria in 2005 as the first line antimalarial drug for the treatment of uncomplicated malaria as a fixed combination of artemether-lumefantrine in the ratio 1(20mg, artemether): 6 (120mg, lumefantrine^[19]). This accounts for it being the most commonly stocked and recommended ACT drug compared to the other combinations available in the market. Even though artesunate-amodiaquine (ART-AMQ) is alternate first line according to the national guidelines, its use in the present study was quite low (3.4%) in consonance with reports from Enugu.^[18] The safety/tolerance level of AL could also account for this preference when compared to other ACT drugs. Studies have established that patients are more adherent to AL in comparison to the ART-AMQ as a result of associated side effects of ART-AMQ.^[20]

Despite the wide use of ACTs, there are irregularities in the general sales of antimalarial drugs. Even though monotherapy of artesunate is not recommended by the pharmacists, there is continued sale or stocking of artesunate as a monotherapy as well as sales of amodiaquine, mefloquine and other partner drugs to artemisinin contrary to the national treatment policy. This act of indiscriminate sale of these drugs constitute an increase in drug pressure in the environment and as

such will predispose a possible threat of ACT resistance being developed. Studies from Thai-Cambodia have reported failure of ACT and reduced parasite susceptibility to artemisinin derivatives leading to delayed clearance.^[21-23] Therefore there is need for enforcement of the policy discouraging the sale of these drugs.

Concomitant administration of analgesics with the antimalarial is understandable considering the accompanying fevers that go with malaria infection. Additional use of multivitamins most times is presumptive and also for psychological benefits of the patients because of the cultural belief of the need to rebuild their immunity having lost some by reason of the malaria infection. Antibiotics use is very common in Nigeria and its co-administration with antimalarial drug is based on the presumption that malaria infection is often associated with typhoid fever as is often seen in many results often given out from private laboratories. On the other hand, it could be an attempt to take care of any other infection besides the malaria.^[24]

The median cost of ₦1, 250 (\$3.45, at an exchange rate of N362 per United States dollar) as established in this study is higher when compared to the \$2.67 obtained from Enugu.^[18] It is important to note that as at the time of the Enugu study, one U.S dollar was equivalent to ₦150. The fluctuation of the Naira and its subsequent downturn has brought a lot of economic hardship on the citizens because inflation rate in Nigeria is significantly influenced by the Naira rate.^[25] For a country with minimum wage of ₦18, 000 (\$51) as at the time of the study, the average cost of treatment for an episode of malaria imposes a very big burden on the populace. It is therefore necessary to strengthen the health system in the areas of drug procurement and availability so as to reduce the economic burden on the individuals.

A major challenge to proper treatment of malaria by the pharmacists is the inability of some of the patients to do the diagnostic tests due to financial constraints such that sometimes the antimalarial drugs are purchased through by self-medication. This is at variance with WHO and national guideline of confirming diagnosis before treatment. Another important limitation to the proper treatment is the inability to track the infections based on the WHO T3 (test, treat and track) policy since this requires additional financial burden on the part of the patients, hence they resort to subjective assessment based on the patient's report. Follow up of patients is mostly done through telephone calls to counsel the patients on the importance of adherence to the dose regimen for proper therapeutic benefits.

CONCLUSION

The study established the treatment pattern of malaria by the community pharmacists to be similar and most were in accordance with the test and treat policy as recommended by the World Health Organization and

national guidelines. However, the continued sale of artesunate monotherapy and other partner drugs of artemisinin calls for increased enforcement of the policy against monotherapy sales as this will reduce the possibility of drug resistance associated with inappropriate use of these drugs.

Limitations to the study

The results of the study may not have brought out the exact situation since the survey is based on questionnaire and as such many of the respondents may not necessarily state what they practice. Also the influence of age in the recommendation of ACTs may be a confounding factor since a greater number (52%) of the study participants were in the age range of 30-39.

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Conflict of Interest

The authors declare no conflict of interest.

REFERENCES

1. Wootton JC, Feng F, Ferdig MT, Cooper RA, Mu J, Baruch DI, Magill AJ, and Su XZ. Genetic diversity and chloroquine selective sweeps in *Plasmodium falciparum*. *Nature*, 2002; 418: 320-3.
2. Tambo E, Adedeji AA, Huang F, Chen J, Zhou S, and Tang L. Scaling Up Impact of Malaria Control Programmes: A Tale of Events in Sub-Saharan Africa and People's Republic of China. *Infect Dis Poverty*; 2012; 1: 7. Doi: 10.1186/2049-9957-1-7
3. Chuma J, Abuya T, Memusi D, Juma E, Akhwale W, Ntwiga J, Nyadigisi A, Tetter G, Shetta R, Amin A: Reviewing the literature on access to prompt and effective malaria treatment in Kenya: implications for meeting the Abuja targets. *Malar J.*, 2009; 8: 243.
4. Davis B, Ladner J, Sams K, Tekinturhan E, de Korte D, Saba J: Artemisinin-based combination therapy availability and use in the private sector of five AMFm phase 1 countries. *Malar J.*, 2013; 12: 135.
5. Federal Ministry of Health National Malaria and Vector Control Division Abuja-Nigeria May 2015 (FMOH). National Guidelines for Diagnosis and Treatment of Malaria – 3rd Edition
6. Gallup, J. L. and J. D. Sachs. The Economic Burden of Malaria, *The American Journal of Tropical Medicine and Hygiene*. 2001; 64(suppl. 1&2): 85-96.
7. Sachs JD & P. Malaney. The Economic and Social Burden Of Malaria. *Nature.*, 2002; 415: 680-685.
8. Annual Malaria Control Programme Review: Ethiopian and Nigeria. 2012. The Carter Centre, Atlanta Georgia.
9. Uganda Bureau of Statistics, "National household Survey report," 2005.

10. Who (1994). The role of the pharmacist in the health care system.
11. Presidential Malaria Initiative (PMI). Malaria Operational Plan NIGERIA, 2011; FY 2012.
12. Ebong OO, Nwauche CA, Ogbuehi IH, Chijioke-Nwauche IN, Ezirim CT, Umoh RE, Afia AG, Zarakokpa P. Is this Evidence of Success in Malaria Prevention and Control Measures? 2015. Greener Journal of Medical Sciences: 2015; 5(1): 001-010.
13. Chijioke-Nwauche IN and Sam-Ozini P. Malaria prevalence and health-seeking behaviour in two Niger Delta Communities. Scholars Academic Journal of Pharmacy (SAJP) Sch. Acad. J. Pharm., 2017; 6(5): 191-196.
14. WHO (2015). Guideline for treatment of malaria, 3rd Edition. pp15-107.
15. Onwujekwe O, Ojukwu J, Uzochukwu B, Dike N, Ikeme A, Shu E: Where do people from different socio-economic groups receive diagnosis and treatment for presumptive malaria in south-east Nigeria? Ann Trop Med Parasitol., 2005; 99: 473–481.
16. Meremikwu M, Okomo U, Nwachukwu C, Oyo-Ita A, Eke-Njoku J, Okebe J, Oyo-Ita E, Garner P. Antimalarial drug prescribing practice in private and public health facilities in South-east Nigeria: a descriptive study. Malar J, 2007; 6: 55-58.
17. Uzochukwu BS, Chiegboka LO, Enwereuzo C, Nwosu U, Okoroafor D, Onwujekwe OE, Uguru NP, Sibeudu FT, Ezeoke OP: Examining appropriate diagnosis and treatment of malaria: availability and use of rapid diagnostic tests and artemisinin-based combination therapy in public and private health facilities in south east Nigeria. BMC Public Health, 2010; 10: 486.
18. Ezenduka CC, Ogbonna BO, Ekwunife O1, Okonta MJ and Esimone CO. Malaria Journal, 2014; 13: 243, Drugs use pattern for uncomplicated malaria in medicine retail outlets in Enugu urban, southeast Nigeria: implications for malaria treatment policy.
19. FMOH. National Antimalarial Treatment Policy. Abuja: Federal Ministry of Health; 2005. Federal Republic of Nigeria; pp. 6–31.
20. Faye B, Offianan AT, Ndiaye JL, Tine RC, Toure W, Djoman K, Sylla K, Ndiaye PS, Penali L, Gaye O: Efficacy and tolerability of artesunate-amodiaquine (Camoquin plus) versus artemether-lumefantrine (Coartem) against uncomplicated *Plasmodium falciparum* malaria: multisite trial in Senegal and Ivory Coast. Trop Med Int Health, 2010; 15: 608–613.
21. Noedl H, Se Y, Schaecher K, Smith B.L, Socheat D. & Fukuda M.M. Evidence of artemisinin-resistant malaria in western Cambodia. N Engl J Med, 2008; 359: 2619-20.
22. O'brien C, Henrich P P, Passi, N. & Fidock D.A. Recent clinical and molecular insights into emerging artemisinin resistance in *Plasmodium falciparum*. Curr Opin Infect Dis., 2011; 24: 570-7.
23. Amaratunga C, Sreng S, Suon S, Phelps ES, Stepniewska K, Lim P, et al. Artemisinin-resistant *Plasmodium falciparum* in Pursat province, western Cambodia: a parasite clearance rate study. Lancet Infect Dis., 2012; 12: 851–8.
24. Dodoo ANP, Fogg C, Asimwe A, Nartey ET, Kodua A, Tenkorang O, Ofori-Adjei D: Pattern of drug utilization for treatment of uncomplicated malaria in urban Ghana following national treatment policy change to artemisinin-combination therapy. Malar J 2009; 8: 2.
25. Nwafor MC. Effect of Naira Rate on Economic Growth in Nigeria. IIARD International Journal of Banking and Finance Research: 2018; ISSN 2406-8634 Vol. 4 No. 1 2018 www.iiardpub.org PP 58-66.