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Uptake of Artemisinin-based Combination Therapy for Treatment of Acute Malaria at Federal Capital Territory Abuja, Nigeria: A Rretrospective Hospital Based Study

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Abstract

Malaria remains a major public health challenge in Abuja. Considerable efforts have been made to reduce the prevalence of the disease; however, the last decade of malaria control has witnessed increased support by government and its partners in the areas of mass distribution of long-lasting insecticidal nets (LLINs) and a massive scale up in malaria case management. Consequently, it has become necessary to provide evidence-based data on the status of progress towards malaria control. A retrospective hospital based study on the uptake of Artemisinin-based Combination Therapy drug for treatment of acute malaria was carried out using a five years hospital records from Wuse District Hospital Abuja. All the records of patients diagnosed with malaria confirmed by Giemsa stained thick and thin peripheral blood films were considered. Data was entered and analyzed using SPSS Chicago version 25. Appropriate tables and mean numbers were displayed. A chi square test was performed to determine the level of significance using 95% confidence interval and p- value. Findings revealed a total of 22,934 patients were diagnosed with acute malaria based on hospital records. Only 48.4% of the patients received Artemisinin Combination Therapy (ACT) drugs. 32.1% of the patients were given non-ACT drugs, 9.3% of patients received Sulfadoxine – Pyrimethamine, 7.59% were given Chloroquine. The study concluded that, The use of Artemisin base Combination Therapy (ACT) as recommended by WHO has a significant influence on malaria treatment outcome.

Keywords*: Artemisinin-based Combination Therapy, Malaria, Uptake, Malaria.*

Introduction

Malaria is endemic in Nigeria and remains a major public health problem, taking its greatest toll on children under age 5 and pregnant women, although it is preventable, treatable, and curable. Africa still bears over 80 percent of the global malaria burden, and Nigeria accounts for about 29 percent of this burden (WHO 2014)

In Nigeria, malaria is responsible for approximately 60 percent of outpatient visits and 30 percent of admissions. It is also believed to contribute up to 11 percent of maternal mortality, 25 percent of infant mortality, and 30 percent of under-5 mortality. It is estimated that about 110 million clinically diagnosed cases of malaria and nearly 300,000 malaria-related childhood deaths occur each year. The disease overburdens the already-weakened health system and exerts a severe social and economic burden on the nation, retarding the gross domestic product (GDP) by 40 percent annually and costing approximately 480 billion naira in out-of pocket treatments, prevention costs, and loss of man hours (FMOH 2014b)

In the FCT, Abuja, Malaria is the leading cause of death followed by diarrhea disease, URTI and UTI. Malaria accounted for about 70% of hospital attendance in the GOPD and 50% of medical admissions (FCT HHSS 2016b) . Malaria prevalence rate in the FCT stood at 43% based on the 2015 National Malaria Indicator Survey report (NBS 2015).

Artemisinin combination therapy (ACT) became first-line treatment for uncomplicated *Plasmodium falciparum* malaria episodes throughout Africa. The urgency for ACT roll-out was spurred by alarming levels of drug resistance to previously used monotherapies such as Chloroquine

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and sulphadoxine-pyrimethamine (SP) with attendance rising morbidity and mortality (Alexander et al 2009).

In early 2000, the World Health Organization (WHO) recommended to all countries experiencing resistance to mono-therapies to use Artemisinin-based combination treatments (ACTs) in treating uncomplicated *falciparum* malaria. Based on the recommendations couple with other factors such as efficacy, cost effectiveness, local industry capacity and some demographic reasons such as the appropriateness for treating in children under five years and in pregnancy, different ACTs were selected as first line drugs to replace the existing mono-therapeutic drugs (WHO report 2000).

Though first-line therapy recommendations may change, clinical practice may still be affected by factors other than the decision or ability to diagnose malaria. Age, diagnostic confirmation and suspected concurrent conditions lead to benefit: risk assessments for individual patients by clinicians as to which anti-malarial treatment to prescribe. This has implications for adherence to policy changes aiming to implement effective use of ACT (WHO manual 2003).

Appropriate management of malaria could only be achieved by using the drugs rationally. This means, using the right drug in the right patient, for the right indication, in the right dose and dosage form, for the right duration of time. The assessment of rational drug use was made difficult due to lack of objective quantitative parameters (Chedi et al 2010).

Adherence refers to the extent to which patients use medications as prescribed by health providers and is an important component of infectious disease control. For the ACTs drugs, various factors may account for non-adherence to their use in real life settings. Some studies have reported that about seventy-six percent (76%) of patients with malaria failed to complete their treatment as prescribed due to poor knowledge on malaria. It has also been established that some people would usually use medications partially or stop the treatment once the symptoms subside and keep the remainder to be used in future. Forgetfulness and poor relationship between health professionals and patients have been reported to affect adherence to the use of medications including ACTs. The use of complex or technical terminologies by prescribers has also been reported to influence adherence to the use of medications (Samuel et al 2015).

Because of the relentless increase in resistance of malaria parasites to conventional drugs, including chloroquine, sulfadoxine–pyrimethamine and mefloquine, new therapeutic approaches of using ACT drugs is a welcome development. This strategy parallels multidrug treatment used successfully in diseases such as HIV and cancer, and combines the rapid schizontocidal effect of an Artemisinin compound with a longer-half-life drug. The World Health Organization (WHO) has recently endorsed ACT as the “policy standard” for all malaria infections in areas where *Plasmodium falciparum* is the predominant infecting species (Timothy et al 2005).

Although malaria treatment policies are well established, with countries in Africa adopting Artemisinin-based combination therapy (ACT) as first-line treatment for uncomplicated malaria, problems on implementation in many settings still persist, undermining the goals of malaria treatment policy. Understanding the extent of these problems is essential for generating evidence for policy interventions to improve implementation. In Nigeria, although ACT has been adopted for first-line treatment of uncomplicated malaria since 2005, evidence abounds on the improper use of anti-malarial drugs, such as the use of monotherapies and other less effective anti-malarial drugs, as well as inappropriate use of ACT (Charles et al 2014).

Aim of the study

To show the rate of utilization of ACT drugs for the treatment of acute malaria in FCT Abuja, Nigeria

Materials and methods

Study area

FCT is located in the North Central geopolitical zone of the country. The territory hosts the capital city of Nigeria, Abuja. It is bounded by Niger State and Kaduna States in the north, Nasarawa State in the east, Nasarawa and Kogi States in the south and Niger State in the west. It has a land area of 8,000 square kilometres. It falls within the Savannah zone vegetation of the West African sub-region.

However, patches of rain forest occur in the Gwagwa plains that form one of the surviving northern-most occurrences of the mature forest vegetation in Nigeria. According to 2006 census, the population was 1,406,239. However, the projected population for 2017 is 3,740,080

The study was conducted in Wuse District Hospital Abuja Nigeria in the Abuja Municipal Area Council of the Territory. The hospital was chosen because; it is the most accessible public hospital with the highest number of bed space and high patient load compared to other public hospitals.

Research methodology

A retrospective study on the diagnosis and treatment of acute malaria based on hospital records of five years (2012-2016) and a rapid appraisal technique of Focus Group Discussions and in-depth interviews with malaria officials.

Sampling technique

All the patients' records that were diagnosed of acute malaria confirmed by Giemsa stained thick and thin peripheral blood films prior to treatment at the General Out Patient and those on admission at FCT Abuja were considered.

Data collection

This included hospital records of patient diagnosed of acute malaria in the general outpatient and those on admission between 2012 and 2016 study years. These data were collated by the hospital medical record staff after two days training on data collection using the developed tools.

Data analysis

Data was entered and analyzed using IBM, SPSS Chicago version 25, Statistical software package. The Mean numbers of malaria patients were calculated by dividing total number of malaria patients enrolled in a particular year by 12. Appropriate tables and mean numbers were displayed. A chi square test was performed to determine the level of significance using 95% confidence interval and p-value.

Table1. Summary of the treatment options for patients diagnosed with acute malaria in wuse district hospital who were admitted between 2012 and 2016 study year

Year	ACT Drugs %	Non-ACT Drugs %	Pyrimenthamine /Sulphadoxine %	Chloroquine %	Others %	Total %
2012	461 (50.7)	284 (31.2)	116 (12.7)	34 (3.74)	15 (1.65)	910
2013	440 (46.6)	367 (38.8)	85 (8.99)	34 (3.60)	19 (2.01)	945
2014	292 (44.4)	162 (24.6)	112 (17.0)	50 (7.60)	42 (6.38)	658
2015	639 (47.7)	392 (29.2)	69 (5.15)	208 (15.5)	33 (2.46)	1341
2016	469 (51.8)	323 (35.7)	61 (6.74)	35 (3.87)	17 (1.88)	905
Total	**2301 (48.4)**	**1528 (32.1)**	**443 (9.30)**	**361 (7.59)**	**126 (2.65)**	**4759**

Ethical consideration

Approval for the study was obtained from the FCT Health and Human Services Secretariat Ethical Committee. Confidentiality of data was also maintained

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Results

The summary of the treatment options for patients diagnosed with acute malaria who were on admission at Wuse District Hospital is shown on Table 1.

Keys

S/NO	ACT Drugs	Non-ACT drugs	Pyrimethamine Sulphadoxine	Chloroquine	Others
1	Artemether/ Lumefantrine	Arterolane/ Piperaquine (Syriam)	Fansidar	Chloroquine	Quinine
2	Artemether/ Amodiaquine	Artesunate/ Sulphadoxine/ Pyrimethamine	Maldox		Artemether Injection
3	Dihydro-Artemisin/ Piperaquine	Proguanil			Halofantrine Hydrochloride (Halfan)
4	Artesunate/ Mefloquine				
5	Artemisin/ Piperaquine				

From the table above, only 48.4% of the patients received ACT drugs for the treatment of acute malaria. It was observed that 32.1% of the patients were given non-ACT drugs, 9.3% of patient were given Sulfadoxine – Pyrimethamine, 7.59% were given Chloroquine while 2.65% of patients were given other drugs.

The analysis of the mean number for treatment options for the patients diagnosed with acute malaria at Wuse District Hospital Abuja is shown on Table 2.

Table2. Mean number for the treatment options for patients diagnosed with acute malaria in wuse district hospital who were admitted between 2012 and 2016 study year

Year	ACT Drugs	Non-ACT Drugs	Pyrimenthamine	Chloroquine	Others
2012	38	24	10	3	1
2013	37	31	7	3	2
2014	24	14	9	4	4
2015	53	33	6	17	3
2016	39	27	5	3	1

From the table 2 above, the mean number for diagnosed malaria patients treated with ACT drugs is highest (53) in 2016 and lowest (24) in 2014 compared to mean number of malaria patients treated with other anti- malaria drugs which was lowest (1) in 2012 and 2016 respectively and highest (4) in 2014.

This is further illustrated in Figure 1.

The Figure 1 below shows the analysis of the treatment options for patients diagnosed with acute malaria who were admitted at Wuse District Hospital Abuja between 2012 and 2016

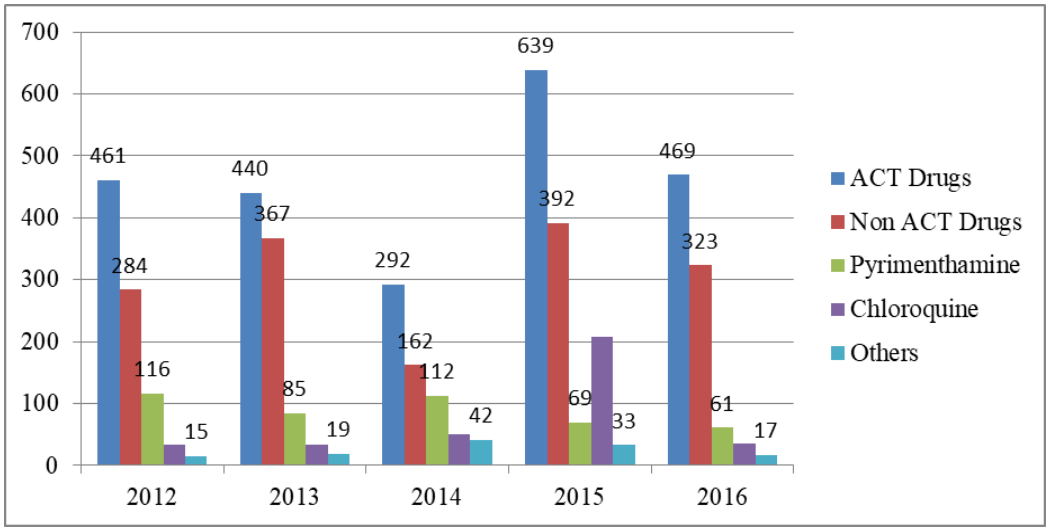

Figure 1. Treatment options for patients diagnosed with acute malaria in wuse district hospital who were admitted between 2012 and 2016 study year

The chi-square statistic is 27.5961. The p-value is .0035314. The result is significant at $p < .05$. Since the p value is less than the level of significance, we cannot accept the null hypotheses and conclude there is a relationship between treatment options and malaria cure.

The summary of the treatment options for patients diagnosed with acute malaria who were outpatients at Wuse District Hospital between 2012 and 2016 study year is shown on Table 3

Table 3. Summary of the treatment options for patients diagnosed with acute malaria in wuse district Hospital who were out patients between 2012 and 2016 study year

Year	**ACT Drugs %**	**Non-ACT Drugs %**	**Pyrimenthamine /Sulphadoxine %**	**Chloroquine %**	**Others %**	**Total %**
2012	2024 (47.2)	1347 (31.4)	642 (15.0)	173 (4.03)	106 (2.47)	4292
2013	1812 (45.2)	1594 (39.7)	393 (9.80)	153 (3.81)	59 (1.47)	4011
2014	1484 (50.8)	708 (24.2)	491 (16.8)	154 (5.27)	85 (2.91)	2922
2015	1075 (48.8)	560 (25.4)	279 (12.7)	134 (6.08)	155 (7.04)	2203
2016	2258 (54.5)	1508 (36.4)	147 (3.55)	175 (4.22)	55 (1.33)	4143
Total	**8653 (49.2)**	**5717 (32.5)**	**1952 (11.1)**	**789 (4.49)**	**460 (2.62)**	**17571**

From the table 3 above, 49.2% of the patients received ACT drugs on the average. Highest being in 2016, accounting for 54.5%. It was observed that 32.5% of the patients received Non-ACT drugs, 11.1% received Sulfadoxine- Pyrimethamine while 2.62% of patients received other drugs.

The analysis of the mean number for the treatment options for patients diagnosed with acute malaria who were outpatients at Wuse District Hospital Abuja is shown on Table 21.

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Table 4. Mean number for the treatment options for patients diagnosed with acute malaria in wuse district Hospital who were out patients between 2012 and 2016 study year

Year	ACT Drugs	Non-ACT Drugs	Pyrimenthamine	Chloroquine	Others
2012	169	112	54	14	9
2013	151	133	33	13	5
2014	124	59	41	13	7
2015	90	47	23	11	13
2016	188	126	12	15	5

From the table 4 above, the mean number of malaria patients treated with ACT drugs was observed to be lowest (90) in 2015and highest (188) in 2016. The mean number of malaria patients treated with Non-ACT drugs is lowest (47) in 2015and highest (133) in 2013. The mean number of malaria patients treated with other types of anti-malaria drugs is lowest (5) in 2013 and 2016 respectively.

This is further illustrated on Figure 2. Figure 2 below shows the analysis of the treatment options for patients diagnosed with acute malaria who were outpatients at Wuse District Hospital between 2012 and 2016 study year

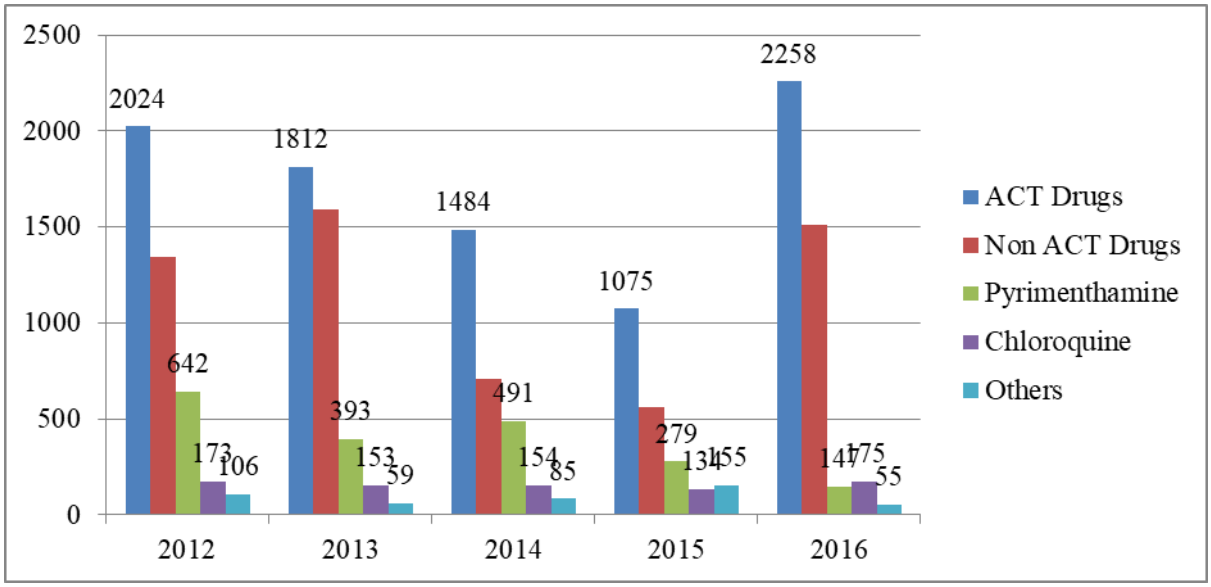

Figure2. Treatment options for patients diagnosed with acute malaria in wuse district Hospital who were out patients between 2012 and 2016 study year

The chi-square statistic for Age group is 68.6804. The p-value is .00001. The result is significant at $p < 0.05$. Since the p value is less than the level of significance, we cannot accept the null hypotheses and conclude there is a relationship between treatment options and malaria cure.

From figure 2 above, those patients who received ACT drugs were highest in 2016 (2258) and lowest in 2015 (1075)

Discussion

This is a five-year retrospective study to access the level of utilization Artemisinin-based Combination Therapy at Wuse District Hospital FCT Abuja Nigeria.

From the study, almost half of the patients who were diagnosed with acute malaria were treated with ACT drugs. The World Health Organization recommends that, patients with acute malaria be

treated with ACT drugs. This study revealed that, some doctors do not prescribe ACT drugs for patients as recommended by the WHO. This may be probably due to lack of continuous medical education for doctors to update their knowledge on malaria management. This study was in line with study done by Aborah et al (2013) on the use of non-prescribed anti-malarial drugs for the treatment of malaria in the Bolgatanga municipality, northern Ghana and which found lack of knowledge of malaria treatment as responsible for the use of non -prescribed anti malaria.

Charles et al (2014) in their study also shows use of ACT in the retail sector. However, the use of monotherapies, particularly through self-medication remains significant with increasing risk of undermining treatment policy. Etuk et al (2008) also observed low prescription of ACT drugs in children below 5 years in a tertiary health institution in Nigeria

Conclusion

From the study, The use of Artemisin base Combination Therapy (ACT) as recommended by WHO and the quality of available malaria services also has a significant influence on malaria control.

There is the need strengthen the culture of good health seeking behaviour which is an important strategy to reduce the burden of malaria. This will involve sensitization activities and awareness campaign to the FCT rural populace on the prevention and control of malaria infection. The use of radio and Television jingles in local languages will go a long way in improving knowledge and treatment protocol on malaria.

From the study also, only about 50% of those diagnosed with acute malaria were treated with ACT drugs. Therefore, there is the need to strengthen and emphasis the use of Artemisin Combination Therapy(ACT) drugs for the treatment of acute malaria as recommended by the WHO. This will involve training of medical officers and other healthcare workers by continuos medical education on current treatment protocols for malaria.

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