Original Research Article

Affordability, Accessibility, and Utilization of Antimalarial Drugs in Nigeria's Niger Delta: Emphasis on Artemisinin Combination Therapy (ACT)

ABSTRACT

Background: Despite recommendations for artemisinin combination therapies as first-line malaria treatment, chloroquine, and other monotherapies continue to be widely used in Nigeria, primarily due to issues related to availability and affordability. **Objectives**: This study aimed to assess the affordability and availability of antimalarial treatments in the Niger Delta, evaluating key factors influencing their use. **Method**: Structured questionnaires focused on affordability and availability were distributed across six local government areas in Delta and Bayelsa States, targeting individuals and various healthcare facilities, including pharmacies, medicine stores, and hospitals. Data were analyzed using SPSS. **Results**: Among the 582 respondents, 62.9% (366) were aware of ACTs; however, only 24.9% considered them affordable. Higher education attainment was positively correlated with affordability and preference for ACTs, with those holding tertiary education more likely to afford and prefer ACTs. The overall availability of ACTs was moderate, at 63.1%, but their presence in government-owned primary health centers was notably limited. As a result, there remains a strong preference for monotherapy, with only 28.9% of respondents choosing ACTs despite WHO recommendations. **Conclusion**: While ACTs are moderately available, their cost limits accessibility, favoring monotherapy use over the recommended ACT treatments. Enhanced affordability and availability of ACTs are essential to improving adherence to WHO malaria treatment guidelines in the Niger Delta region.

Keywords: *Artemisinin-Based-Combination therapy, antimalarial availability, affordability, Niger Delta, healthcare accessibility*

INTRODUCTION

Malaria is a known endemic disease in sub-Saharan Africa, causing about 85%–90% of deaths (Provost, 2011; Charles et al., 2024). Malaria is responsible for more than 25-30% of infant deaths in Nigeria(Oprehe*t al,* 2008).The resistanceof*Plasmodium falciparum*toChloroquinehascontributedsubstantiallytomalariamorbidity and mortality, hence the introduction of Artemisinin Combination Therapy(ACTs) has received great hope as a breakthrough in the treatment of malaria.Despite the change from Chloroquine and sulfadoxine-pyrimethamine to ACTs as first-line treatment for malaria, literature evidence shows that Chloroquine is still beingwidely used in Nigeria (Ukwe and Ekwunife,2008) and evidence exists that healthcarefacilitiesinthecountryareyettofullycomplysincechloroquine,sulfadoxine-pyrimethamine and artesunate monotherapy are still prescribed for the treatment ofmalaria (Odili*et al,*2010). Poverty is significantly associated with an increased risk

formalaria (Oprehet *al,* 2008) and a study has shown that poor patients are not preparedto pay the costs of ACTs (Wiseman *et al,* 2005) even though combinationtherapydominatestheeffectivenessofmonotherapy(Wisemanetal,2006).Thi s implies that the poor lackaccesstoappropriatemalariatreatment.

Malaria may have been a human pathogen for the entire history of the species (Keeling, & Rayner, 2015) and Humans may have originally caught Plasmodium falciparum from gorillas (Hayakawa *et al*., 2008). Malaria is caused by *Plasmodia spp*;*Plasmodium vivax* is rare in Africa where much of the black population lacks the erythrocyte cell surface receptor for infection. *P. falciparum* and *P. ovaleare* the most predominant species in Africa and *P. malariae* is the least common and mildest form of malaria (Twohig et al., 2019). In sub-Saharan Africa, malaria accounted for about 95% of all cases and 96% of deaths with about 80% of these deaths reported in children below 5 years of age(Oladipo et al., 2022). In Africa, malaria is present both in rural and urban settlements though the risk is lower in larger cities (James et al, 2009).Prevention of malaria can aim at either preventing infection by avoiding bites by parasite-carrying mosquitoes or prevention of the disease by using antimalarial drugs prophylactically (Tizifa et al., 2018). Antimalarials are drugs taken for the treatment of chronic or acute attack or prophylaxis of malaria. They are classified based on their chemical structure and also their mode of action (Ajibola, 2005). There are several classes including gametocides: primaquine, quinine, mepacrine; casual prophylactics: primaquine proguanil, pyrimethamine; sporonticides: primaquine; schizonticides: sulphonamides; blood schizonticide: quinine, mepacrine, chloroquine, artemisinin-based family, etc., (Bunu et al., 2020; Ebeshi et al., 2023; Samuel et al., 2023).Resistance has emerged to virtually all classes of antimalarials except the ACTs(Menard, &Dondorp, 2017). The choice of ACT in a country or region is based on the level of resistance of the partner medicine in the combination. In areasof multidrug resistance, artesunate-mefloquine or artemether-lumefantrine is recommended or artesunate sulfadoxine-pyrimethamine can be used (Arya et al., 2021; Hanboonkunupakarn et al., 2022).

Affordability refers to the price of a commodity or service concerning the client's ability to pay (Larson et al, 2006). In developing countries, most people who need medicine have to pay for them out of their own pockets. Unaffordable prices in countries (Larson et al., 2006). The potential value of drug combinations particularly ACTs is widely acknowledged and accepted and high costs are still a major barrier to their effective use. The unaffordable price could lead to the use of sub-optimal doses, ineffective treatment, increased chances of developing

resistance,and perhaps ultimately to increase malaria death (WHO, 2008).Availability refers to the physical presence of the medicine at the service delivery point (Levesque et al., 2013; Brambifa et al., 2020). Even when ACTs are provided free in public, non-governmental, availability in peripheral public health facilities remains a challenge (Larson et al, 2006; Wasunnaet al., 2008).

The role of pharmacists has increased over the last decade in many countries, thus resulting in their increasing involvement in patient care and active participation in public health care programs (Keeling, & Rayner, 2015). Pharmacists shouldhave a thorough understanding of the medical and socio-economic problems associated with the disease, including the vulnerable groups, know the various diagnostic methods, and their advantages and disadvantages, and familiarize themselves with the various national and international anti-malarialtreatment guidelines and protocols (Bunu &Otuaga, 2020; Samuel el al., 2021; Midia et al., 2023).In addition, they should have in stock the recommended, good quality anti-malarial medications such as ACTs, and long-lasting ITNs, have sufficient public health care focus in their practice to fully appreciate the problem, and also be ready to provide wide-scale community-based malaria-related services (Krezanoski, 2016; Agudelo et al., 2021; Chu & White, 2021).The Pharmacist being a member of the healthcare team has a unique role to play in ensuring good quality antimalarial drugs are available and that they are rationally administered to patients at every level of health care (Ehijie, 2010).The study aimed toassesstheavailabilityandaffordabilitystatusofantimalarial especiallythe first-linetreatmentdrugsin the Niger Deltaregion.

METHOD

Study Area

The study was conducted in selected local government areas (LGAs) of Bayelsa and Delta states. For Bayelsa State, Southern Ijaw LGA, Sagbama, and Yenagoa LGAs were selected, while Delta State, Udu, Uvwie, and Ughelli North local government areas were selected, respectively.

Study Design and Data Collection Instrument

A descriptive-cross-sectional study design was used in this research. A well-structured study questionnaire was prepared for the affordability and availability of antimalarial drugs. The affordability component was a descriptive cross-sectional survey to determine levels of affordability in selected local government areas in Delta and Bayelsa States. The study includes administering a structured questionnaire to respondents to collect data on the affordability of antimalarial medications. The

questionnaire utilized for this investigation included demographic questions. A total of 600questionnaireswere administeredin the two states, but only 582 were retrieved, having a percentage response rate of 97%. The questionnaires were intended for patent medicine stores, community pharmacies, and primary, secondary, and tertiary health centers and were disseminated throughout the states in the specified LGA. The surveys included a list of antimalarial medications, as well as information about their availability and pricing. The respondents were asked to rate availability (YES/NO) and include the price for each medicine. The cost of malaria prevention (the cost of insecticide-treated bed nets, or ITNs) and malaria parasite tests were also considered.

Sample Size

A sample size of 300 respondents was drawn from the 3LGAs in Delta State, while 283 respondents were obtained from Bayelsa State, making a total of 582 respondents.Inclusion criteria were those respondents who have had malaria and had bought antimalarial drugs, age brackets of 16years and above, and those who gave their informed consents. Each respondent was given enough time to fill the questionnaires and non-educated respondents were helped to fill the questionnaires based on their answers to the questions they were asked.

Ethical Issues and Data Analysis

The study was approved by the research and ethic committee of the Faculty of Pharmacy, Niger Delta University, Bayelsa State, Nigeria. Data retrieved from the study were analyzed with SPSS software utilizing ANOVA and simple descriptive statistics.

RESULTS

Demographics

All the respondents interviewed were 582 and were between the ages of 16 to >60 years ofage. About 47.9% of the respondents were students, 22.9% (133) were civil servants18.9% (110) were traders, and 10.3% (60) engaged in other activities. Also, 62.2% (362) had tertiaryeducation,28%(163)secondary, 6.7% (39) had primary education, and 3.1% (18) had no formal education.59.6%(347)were single33.7%(196)married1.2%(7)divorcedand5.5%(32)separated.11.2%(65)oftherespondentswerepregnant. This is depicted in Table 1.Appropriatetreatment-seekingbehavioraboutmalariawashigh;84%(489)oftherespondentsclaimedthey treatedmalariausing the orthodox method.

Table 1. Participants Demographic data

Variables		Frequency(N)	Percentage(%)
Sex	Male	256	44
	Female	326	56
Age (years)	16-25years	240	41.2
	26-40years	251	43.1
	41-60	76	13.1
	>60 years	15	2.6
Occupation	Student	279	47.9
	Civilservant	133	22.9
	Trader	110	18.9
	Other	60	10.3
LevelofEducation	Primary	39	6.7
	Secondary	163	28
	Tertiary	362	62.2
	None	18	3.1
State origin & LGA	**Delta state**	**300**	**51.5**
	Udu	100	17.2
	UghelliNorth	100	17.2
	Uvwie	100	17.2
	Bayelsa state	**282**	**48.5**
	SouthernIjaw	100	17.2
	Sagbama	82	14.1
	Yenagoa	100	17.2
MaritalStatus	Single	347	59.6
	Married	196	33.7
	Separated	32	5.5
	Divorced	7	1.2
PregnancyStatus	Positive	65	11.2
	Negative	243	41.8
	Notapplicable	247	47

Antimalarial Affordability

About 62.9% (366) of the respondents knewabout ACTs, 24.9% knew about ACTs asveryaffordableand23%indicatedunaffordability.36.6% (213) of the respondents earn between NGN5000–NGN 10,000andonly2.4%earn>NGN100,000monthly.19.4%(113) were willing to spend NGN2000 for the treatment of malaria fora child under 5years of age and adults, 21.8% (127). Then, 38% (221) were willing tospend NGN1000 for the treatment of malaria for a child under 5, and 33.2% (193) could payNGN1000 for the treatment of anadult.About 32.3% (188) were willing to spend NGN1000 for the preventionof malaria for a child under 5 years of age and adult, 30.1% (175). Three

factors that majorly dictated the choice of antimalarials bypatients are cost(29.2%), availability(21.5%), and drug efficacy(37.5%).

It was observed that 314 respondents with tertiary education preferred to use the orthodox methodin treating malaria and only 31 persons with primary education preferred to use the orthodox.The affordability of ACTs was highest in people with tertiary education and thenpeople with tertiary educationwereseentoearn the most.The results also showed that 50 and 63 persons can willingly spend NGN2000 fortreatmentofmalariainunder-fivesinDeltaStateandBayelsarespectively.Then101and 92 persons can spend NGN1000 for the treatment of malaria in adults in Delta andBayelsarespectively.74 respondents in Delta and 66 persons in Bayelsa preferartesunatemalariawhile68personsinDeltaand100personsinBayelsapreferACTsintreating malariaAlso,itwasseenfromtheresultthat213respondentsearnwithinNGN5000-NGN10,000 and only 36.3%T (77) of this individual prefer chloroquine as drug choicefortreatmentofmalaria.Furthermore,22 respondentswere seentoearn betweenNGN51,000–NGN100,000 and 59.1% (13) of this group of individuals tend to preferACTdrug choicemalaria.

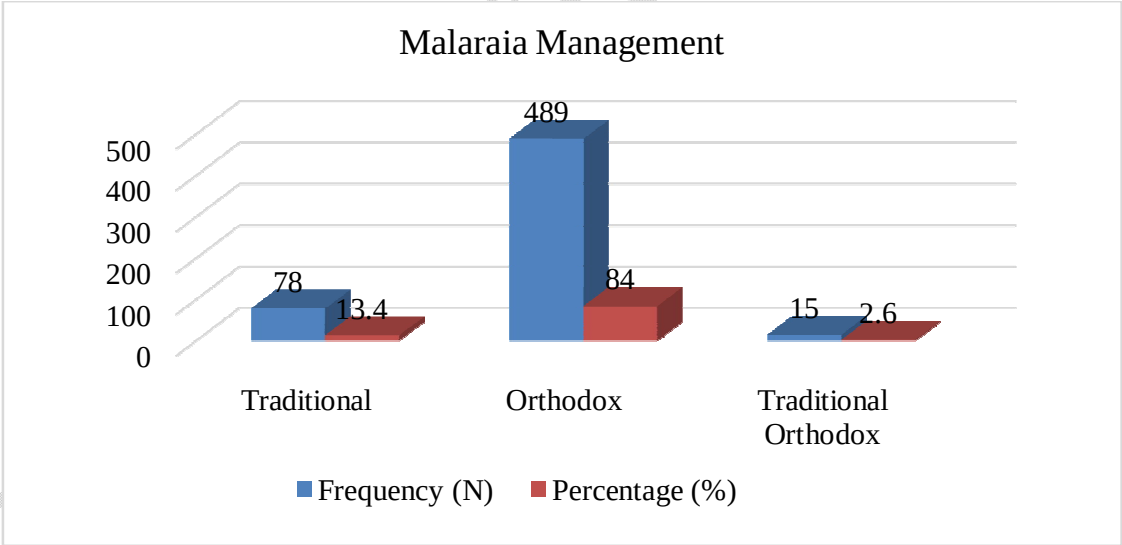

Figure 1. Malaria treatment pattern

Table 2. The reasonbehind the use of traditionaltreatmentpatterns, perceptionofavailability&affordability of ACTs

Variables		Frequency (N)	Percentage(%)
Whytraditional treatment?	Morecost-effective	60	10.3
	Lesssideeffect	26	4.5
	Notapplicable	468	80.4
	Moreefficacious	21	3.6
	Because offakingof orthodoxmedicine	4	0.7
	Unavailabilityoforthodox drugs	2	0.5
Perceptionof availability	Alwaysavailable	144	24.7
	Frequentlyavailable	156	26.8
	Rarelyavailable	68	11.7
	Don'tknow	212	36.4
	Neveravailable	2	0.3
Perceptionof affordability	Veryaffordable	91	15.6
	Somewhatavailable	193	33.2
	Notaffordable	84	14.4
	Don'tknow	214	36.8

Table 3. The amountrespondentscanspendwillinglyfortreatment and prevention of achild <5 years andanadult.

Amount (NGN)	Preventionof a child<5years (n)(%)	Preventionina nadult (n)(%)	Treatmentof a child<5years (n)(%)	Treatmentof anadult (n)(%)
2000	83(14.3)	91(15.6)	113(19.4)	127(21.8)
1000	188(32.3)	175(30.1)	221(38)	193(33.2)
800	83(14.3)	103(17.7)	52(8.9)	80(13.7)
500	147(25.3)	129(22.2)	138(23.7)	115(19.8)
400	34(5.8)	31(5.3)	22(3.8)	31(5.8)
300	20(3.4)	20(3.4)	13(2.2)	11(1.9)
200	17(2.9)	20(3.4)	12(2.1)	14(2.4)
100	10(1.7)	13(2.2)	11(1.9)	11(1.9)

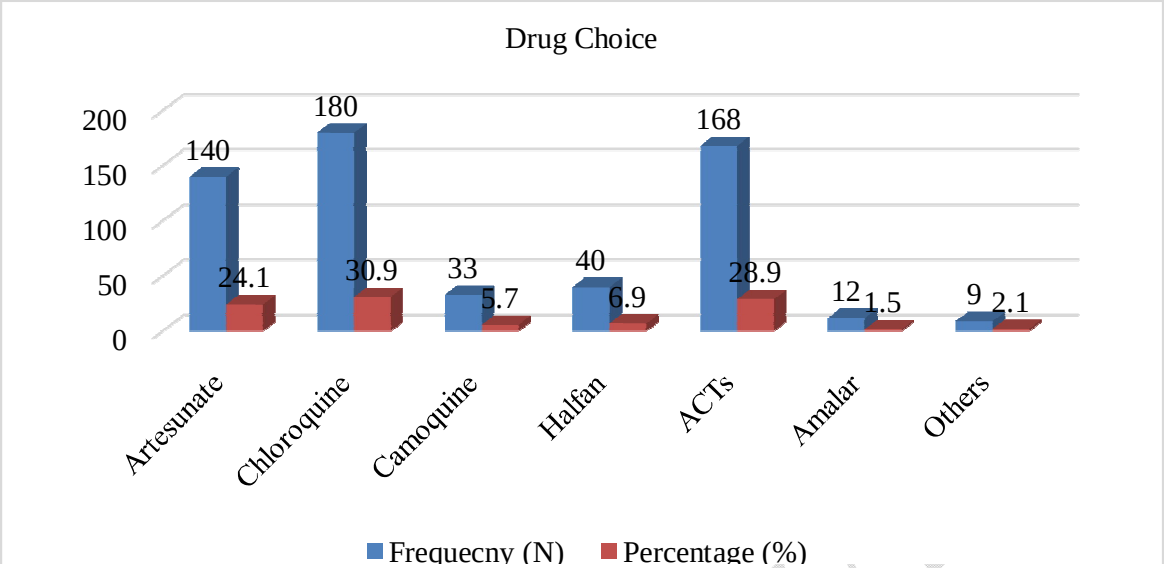

Figure 2. Respondent'sDrugofChoice

Table 4. Reasons behind the drug choiceand preferredplaceofdrugpurchase

Variables		Frequency(N)	Percentage(%)
Reasons behind the drug choice	Costs	170	29.2
	AlwaysAvailable	125	21.5
	LessSideEffect	65	11.2
	Efficacy	218	37.5
	Others	1	0.2
	NotApplicable	3	0.5
Preferred place of drug purchase	Pharmacy	311	53.4
	Chemist	224	38.5
	Market	8	1.4
	Hawkers	7	1.2
	Hospital	26	4.5
	Notapplicable	6	1.0

Table 5. Comparative analysis: how much respondents are willingto pay for treatment and prevention for a child and anadultinbothstates

Amount	T <5 DE	T <5 BY	P<5 DE	P <5 BY	T AdultDE	T AdultBY	P AdultDE	PAdultBY
2000	50	65	27	56	52	75	40	51
1000	104	117	84	104	101	92	94	81
800	24	28	43	40	44	36	55	48
500	86	52	94	53	66	49	67	62
400	15	7	24	10	16	15	15	16
300	8	5	14	6	6	5	13	7
200	6	6	8	9	8	6	9	11
100	7	4	6	4	7	4	7	6

T-Treatment, P-Prevention, BY – Bayelsa, DE – Delta, <5 – less than 5 years

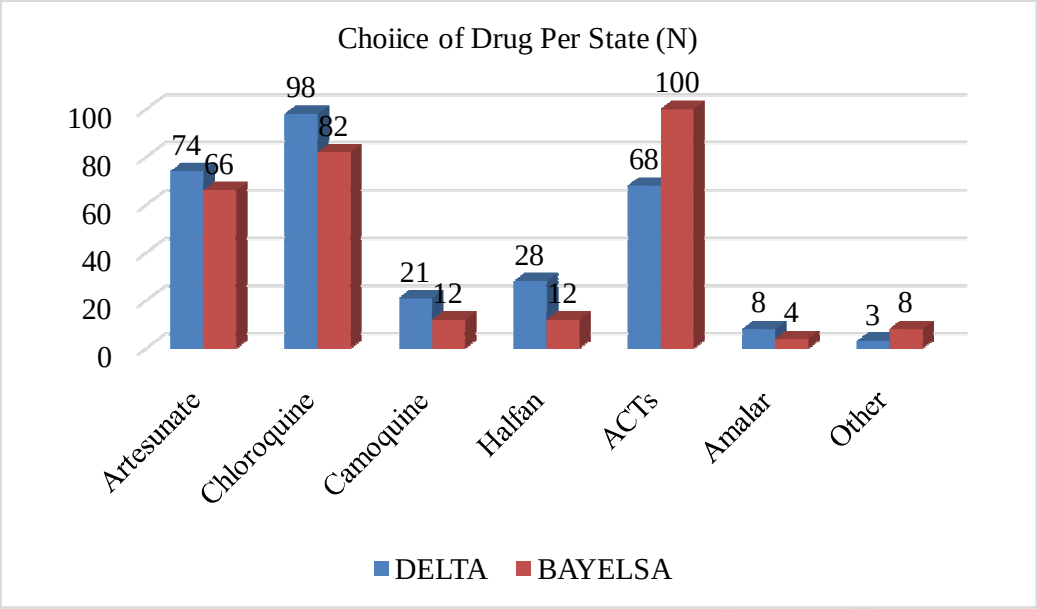

Figure 3. Respondent'sdrugpreferencevsstate of origin

Table 6. Comparativeanalysis:treatmentpattern,monthly salary, etc., totheir educationalstatus

Variables: Educational level→		**Primary**	**Secondary**	**Tertiary**	**None**
HowRespondents TreatMalaria	Orthodox	31	133	314	11
	Traditional	6	27	38	7
	Orthodox Traditional	2	3	10	0
Affordability	VeryAffordability	5	25	59	2
	Somewhat Affordable	6	35	149	3
	NotAffordable	2	34	48	0
	Don'tKnow	26	69	106	13
MonthlyIncome (NGN)	5000-10000	10	68	30	5
	11000-20000	19	40	100	5
	21000-40000	2	20	60	4
	41000-50000	4	19	31	2
	51000-100000	1	4	15	2
	>100000	1	1	12	0

Availability of Antimalarial

Patient medicine stores were more common than hospitalsand even pharmacies as indicated in the study. It was seen that only 24.6% (16) use fans, refrigerators, andairconditionerstoimprovetheconveniencestatusofthepremiseaswell asstorage Condition. Also, pharmacists had the highest frequency as dispensers (35.4%) followed by nurses (30.8%), which isfairly good. 50.8% (23) of the facilities surveyed had insecticide-impregnated bed nets available and35.4% (23) did not have them. Only 9.2% (6) facilities had ITNs free of charge to all patients.For 13.8% (9) of the facilities surveyed that had nets, the cost was between NGN501-NGN1000, andonly3.2%(2)facilitiessold

forlessthanNGN500.

TheresultforavailabilityofACTsshowsthatACTsareovertlyavailableasArtemether - Lumefantrine had 90.8% Artesunate Amodiaquine had 63.1% ArtesunateMefloquinehad43.1%.However,thecost rangesfromNGN500.00 to NGN1500.00. Also, antimalarial monotherapy drugs were seen to have a higher availability profile aswellonlythataremuchmoreaffordablethanACTsbetween<NGN50asinchloroquinetoNGN 300forartesunateandalso sulfadoxine-pyrimethamine(SP). Lastly, it was observed that malaria parasite test was conducted in12 pharmacies and 3 secondary health centers. The costrangesfromNGN300-NGN500.Onlyintheprimaryhealthcenterofthefacilitywas the malariaparasitetestconductedfor free. The four primary health facilities visited in Delta State had no drug in stock for sale topatients.Health workersonlydiagnoseandsend patientstobuydrugsfromoutside. The cost of drugs was seen to be slightly higher in pharmacy shopsthan in other facilities, and drugs cost little or nothing in primary health centers only thattheyarerarely available. From the results obtained, there is no significant difference in the prices of ACTs inbothstates.

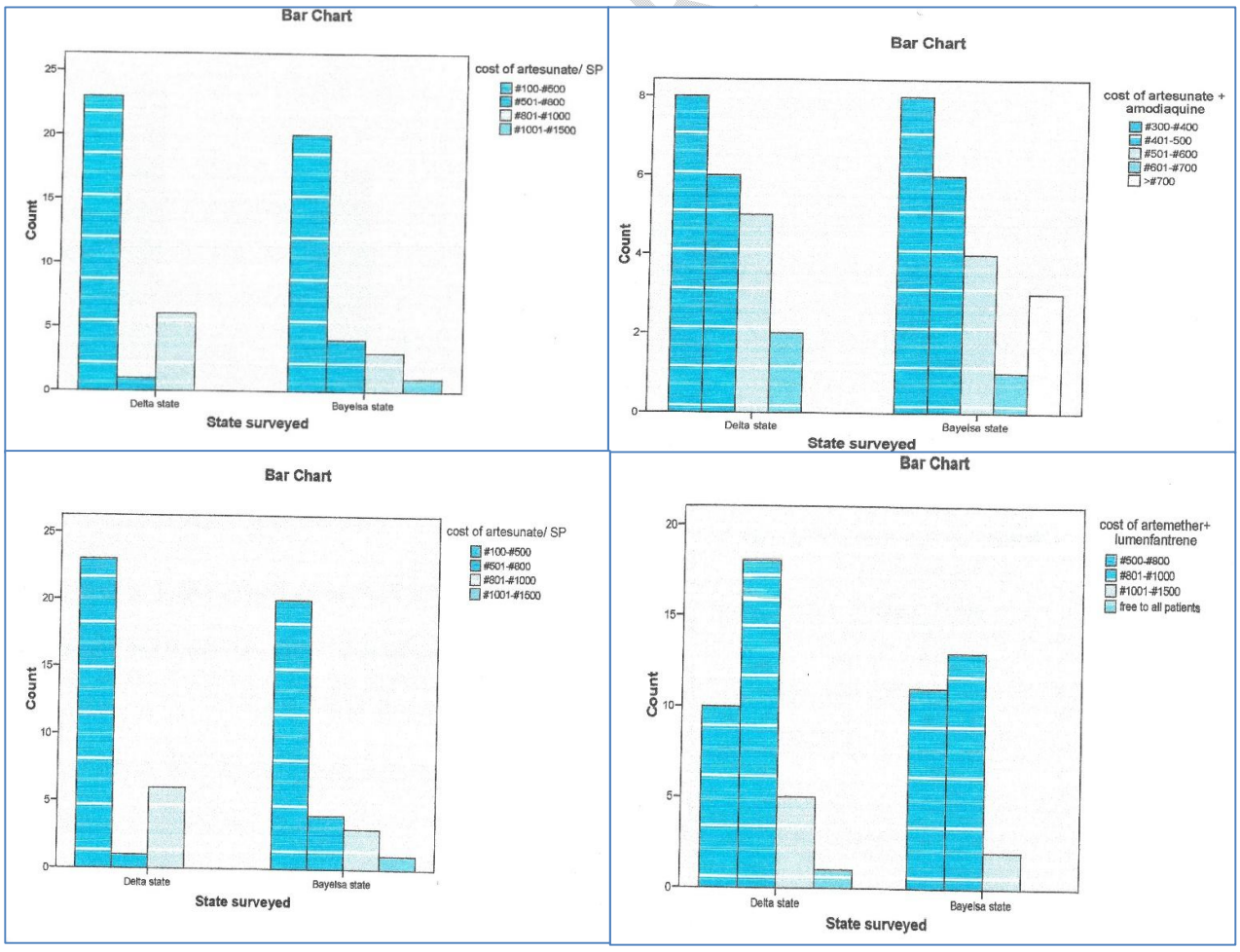

Figure 4. Comparative analysis of the cost-effectiveness of antimalarial among the two states

Table 7. Facilitystatus

Variables		Frequency(N)	Percentage(%)
Facility	Patent medicine store	34	52.3
	Pharmacy	26	40
	Primary health center	1	1.5
	Secondary health center	4	6.2
Registration status of pharmacy	Yes	29	44.6
	No	1	1.5
	Not applicable	35	53.8
Storage condition/convenience	Fan	26	40
	Air conditioner	7	10.8
	Refrigerator	8	12.3
	Fan air conditioner	1	1.5
	Fan air conditioner refrigerator	16	24.6
	Fan refrigerator	4	6.2
	Air conditioner & refrigerator	1	1.5
	None	2	3.1
Dispenser	Pharmacist	23	35.4
	Sales attendant	15	23.1
	Nurse	20	30.8
	Others	3	4.6
	Pharmacist and Nurse	2	3.1
	Pharmacist, Nurse, and Sales attendant	2	3.1
Availability of ITNs	Yes	33	50.8
	No	23	35.4
	Not applicable	9	13.8
Is ITN free to all patients?	Yes	6	9.2
	No	32	49.2
	Notapplicable	27	41.5
Costofbednet(NGN)	<500	2	3.1
	501-1000	9	13.8
	1001-1500	7	10.8
	1501-2000	5	7.7
	2001-3000	1	1.5
	>3000	1	1.5
	Notapplicable	40	61.5
Locationoffacility	DeltaState	37	56.9
	Bayelsa State	28	43.1

Table 8. Availability of antimalarials

Availabilityand%availabilityofantimalarials		
Antimalarials/test	**Available N (%)**	**Not available N (%)**
Artesunate + Amodiaquine	41(63.1)	24(36.9)
Amodiaquine+Dihydroartemisinin	10(15.4)	55(84.6)
Artemether + Lumefantrine	59(90.8)	6(9.2)
Artesunate+Mefloquine	28(43.1)	37(56.9)
Amodiaquine	49(75.4)	16(24.6)
Artemether	46(70.8)	29(29.2)
Artesunate+Sulfadoxine/Pyrimethamine	58(89.2)	7(10.8)
Artesunate	59(90.8)	6(9.2)
Chlorproguanil + Dapsone	10(15.4)	55(84.6)
Chloroquine	52(80)	13(20)
Dihydroartemisinin	47(36.9)	18(27.7)
Dihydroartemisinin+Piperaquine+Trimethoprim	24(15.4)	41(63.1)
Halofantrine	48(73.8)	17(26.2)
Mefloquine	10(15.4)	55(84.6)
Malaria Parasite Test	26(40)	39(60)
Proguanil	38(58.5)	27(41.5)
Primaquine	16(24.6)	49(75.4)
Pyrimethamine	32(49.2)	33(50.8)
Quinine	54(83.1)	11(16.9)
Sulfadoxine/Pyrimethamine	63(96.9)	2(3.1)
Sulfamethopyrazine+Pyrimethamine	24(36.9)	41(63.1)
Sulfamethopyrazine+Pyrimethamine	17(26.2)	48(73.8)

Table 9. Costofantimalarials

Name of Antimalarial	**Cost(NGN)**						
	<100-200	201-400	401-600	601-800	801-1000	1001-1500	>1500
	N (%)	N (%)	N (%)	N (%)	N (%)	N (%)	N (%)
Amodiaquine	39(60)	6(9.3)	5(7.7)	-	-	-	-
Artesunate+Amodiaquine	-	16(24.6)	21(32.3)	3(4.6)	3(4.6)	-	-
Artemether+ Lumefantrine	-	-	-	21(32.3)	31(47.7)	7(10.8)	-
Artesunate/SP	-	43(66.2)	-	5(7.7)	9(13.8)	1(1.5)	
Artemether	-	-	9(13.8)	15(23.1)	-	11(16.9)	10(15.4)
Artesunate	-	25(69.2)	3(16.9)	6(4.6)	-	-	-
Artesunate+Mefloquine	-	1(1.5)	-	11(16.9)	-	16(25.0)	-
Chloroquine	34(52.2)	18(27.7)	-	-	-	-	-
Chlorproguanil+Dapsone	-	6(9.2)	-	-	4(6.2)	-	-
Dihydroartemisinin	-	-	-	42(64.6)	-	3(4.6)	-

Dihydroartemisinin + Piperaquine +Trimethoprim	-	10(15.4)	-	-	14(21.5)	-	-
Amodiaquine + Dihydroartemisinin	-	-	-	4(6.2)	5(7.7)	-	-
Halofantrine	-	-	-	8(12.3)	9(13.8)	30(46.2)	1(1.5)
Mefloquine	-	-	-	5(7.7)	7(10.8)	-	-
Primaquine	-	-	10(15.4)	-	6(9.2)	-	-
Proguanil	-	-	12(18.5)	-	3(4.6)	23(35.4)	-
Pyrimethamine	32(49.2)						
Sulfadoxine + Pyrimethamine	16(24.6)	45(69.2)	-	2(3.1)	-	-	-
SP+Mefloquine	-	20(30.8)		6(9.2)	-	-	-
Sulfamethopyrazine+Pyrimethamine	8(12.3)	10(15.4)	-	-	-	-	-
MalariaparasiteTest	-	9(13.8)	14(21.5)	1(1.5)	1(1.5)	-	-
Quinine	-	33(50.7)	21(32.3)	-	-	-	-

Table 10. Comparativeanalysisofavailability&costof antimalarial indifferent facilities

Variables		**PatentMedicine Store**	**Pharmacy**	**PrimaryHealth Center**	**Secondary HealthCenter**
Availability	Yes	13	16	1	3
	No	21	10	0	1
Isitfreetopatients?	Yes	4	0	1	1
	No	30	16	0	3
What'stheCost?(NGN)	<500	2	0	0	0
	501-1000	3	6	0	0
	1001-1500	1	5	0	1
	1501-2000	0	5	0	0
	2501-3000	1	0	0	0
	>3000	1	0	0	0
AvailabilityStatusofDrug (N)		PatentMedicineStore	Pharmacy	PrimaryHealthCenter	SecondaryHealthCenter
Artemether+ Lumefantrine	Yes	30	24	1	4
	No	4	2	0	0
Artesunate+ Mefloquine	Yes	10	16	0	2
	No	24	10	1	2
Artesunate+SP	Yes	30	25	0	3
	No	4	1	1	1
Artesunate+Amodiaquine	Yes	20	19	0	2
	No	14	17	1	2

Table 11. ComparativecostofACTsindifferentfacilities

CostofDrugs(NGN)		PatentMedicineStore	Pharmacy	Primary HealthCenter	SecondaryHealthCenter
Artemether+Lumefa	500-800	13	7	0	1

ntrine	801-1000	13	15	0	3
	1001-1500	5	2	0	0
Artesunate+ Amodiaquine	300-400	13	2	0	1
	401-500	5	6	0	1
	501-600	3	6	0	0
	601-700	1	2	0	0
	>700	0	3	0	2
Artesunate+SP	100-500	25	17	0	1
	501-800	2	2	0	1
	801-1000	3	5	0	1
	1001-1500	0	1	0	0
Artesunate+ Mefloquine	>500	1	0	0	0
	501-1000	4	6	0	1
	1001-1200	4	9	0	1
	1201-1500	1	1	0	0

DISCUSSION

Theaffordability analysis showedthatthe poor willhavedifficulty andmay notbe sowilling to pay for their antimalarial medicines (ACTs). This is consistent with a study conducted in Benin City, Nigeria, which revealed that first-line antimalarial drugs are not cost-effective to the majority of the people who live in poverty, as the least paid government employee must work for 5.53 to 10.38 days before they can pay for one full dose of artemether/lumefantrine tablet, which is the recommended first-line anti-malarial drug in the national malaria treatment policy(Waka and Cyril 2011). Another research on the perception ofhealthcare providers towards chloroquine and ACTs showed that though respondents(pharmacist and doctor) preferred ACTs to chloroquine they did not believe that theACTS were affordable to their patients (Waka and Oguagbaka, 2011). This lack ofaffordability will hurt drug compliance and reduction in malariamorbidityandmortalitywillnotbeachieved.Antimalarial drugs were seen to be less affordable in private pharmacies than in otherfacilities. This seems to imply that dispensers are making up their drugs excessively to make a larger profit. This is in line with a study carried out in Kenya whichshowed in some settings patients pay less at medicine stores than in other facilities toobtain a drug (Amin et al, 2003). This tendency of increased profits could lead toirrational drug use has been reported in Zimbabwe where a desire to increase incomewasassociatedwithlessclinicallyandeconomicallyappropriateprescribing(Mekonnen et al., 2021).The results suggest that individuals are prepared to spend the same amount of money, if not more, on malaria prevention and treatment for both children under the age of five and adults. This describes the popular adage "prevention is better

than cure." However, there are numerous and unquantifiable costs connected with malarial disease, such as the cost of pain and suffering, time spent in the hospital, and, most crucially, the cost of absenteeism from work owing to illness.

ThisstudyalsoshowedthatACTsarefairlyavailablehoweverlessavailableinprimary health centers. This is in line with a study in Kenya that showed that a quarterof public health facilities had none of the nationally recommended ACT treatment instockandthree-quarterslackedthefullrangeofweight-specificpacksrequired(Wasunnaetal,2008).Meanwhile,modernmedicinereliesheavilyon drugsasthemain tool of therapeutics. Other therapeutic proceduressuch as diet surgery exerciseetc are also important of course as deliberate non-intervention but none is so widelyappliedas drug-basedtherapeutics(RangandDale,2007).Malaria is a major cause of death and illness in children and adults especially intropical countries (WHO, 2010), preventivemeasureslike the availability ofinsecticide-impregnated bed nets ought to be readilyavailable and distributed for free for every household in the country done inEthiopia(Andualem,2007).

Also, WHO guidelines emphasize testing malaria with RDTs or microscopybeforetreating it(evidence-basedrecommendation)(WHO,Guidelinesfortreatingmalaria,2010).As a result, pharmaceutical vendors should be taught in RDTs to minimize ACTs expenses in cases where malaria parasites are not involved and to protect ACTs from resistance by assuring their reasonable usage. RDTS (RAPID DIAGNOSTIC TEST) detects plasmodium-specific antigens in a finger-prick blood sample using immunochromatographic methods and can be performed by anybody with minimum training (Orish et al., 2018). Reducing multiple taxes levied by the state and local governments, as well as price regulation, may help to lower medicine prices in Nigeria. Drug prices in private facilities must be controlled and monitored to remain below reasonable limits. Furthermore, the government must raise minimum earnings above what they now are so that the poor can be buoyant enough to afford antimalarial drugs(Wakaand Cyril,2011).

CONCLUSION

When compared to antimalarial monotherapy medications, ACTs are more expensive for the vast majority of poor people. Also, ACTs have not acquired traction as the first line of malaria treatment in the two states surveyed, as a large portion of the population has yet to learn about them. Furthermore, malaria management is suboptimal, as shown by a strong predilection for antimalarial monotherapy. Finally, ACTs are reasonably available, but the cost makes them inaccessible.It is pertinent to

note that, the unavailability or restricted access to essential medicines like antimalarial in rural communities will pose a threat to the general public and therefore become a public health concern as it will negatively impact on health of the community. Therefore,the government and policymakers,as well as healthcare providers,should collaborate and enhance ACTs' accessibility and affordability by strengthening the drug revolving funds, increasing the coverage of health insurance schemes, and engaging in community health advocacy programs.

Disclaimer (Artificial intelligence)

Author(s) hereby declare that NO generative AI technologies such as Large Language Models (ChatGPT, COPILOT, etc.) and text-to-image generators have been used during the writing or editing of this manuscript.

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