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Baseline Indicator Survey of Malaria Prevalence in Benue South: Implications for Local Specific Control Interventions

E[1*]. Ogah, C.O[2], Aju-Ameh, S.O[1]. Adoga, K.A[3]. Adeneyi and O[4]. Obiajunwa

[1]Department of Chemistry Federal University of Health Sciences, Otukpo
[2] Department of Biological Sciences Federal University of Health Sciences, Otukpo
[3] Department of Public Health and Epidemiology, Nigerian Institute of Medical Research, Yaba, Lagos.
[4] Department of Community Health, Gregory University, Uturu.

Correspondence Email: uhinyohe@gmail.com

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Abstract
In this study, the prevalence of malaria in Benue South was undertaken fifty willing symptomatic individuals were randomly selected from each of the nine Local Government Areas (L.G.As) of the zone. Blood samples were collected under sterile condition by swabbing the area with 70 % alcohol and air dried. Thick and thin smear of blood samples were examined under the microscope. The survey results showed the following; Oju (66 %), Obi (74 %), Ohimini (68 %), Ogbadibo (78 %), Okpokwu (54 %), Apa (52 %), Otukpo (58 %), Ado (62 %), Agatu (64%). The study also showed that 14% took malaria treatment action in 24 hours, 28.67 % (1-3days) and 56.67 % (after four days). 25.78 % of the respondents went to hospital for treatment while 40.22% went to a patent medicine dealer, 27.11% treated themselves at home and 6.89 went to faith/prayer homes. The high prevalence of malaria can be better addressed by creation of awareness on malaria prevention measures and promptly visiting the hospital for proper medication.
Key words: Malaria, Plasmodium, Prevalence, Burden, Benue South

Introduction

Malaria is a parasitic disease that is treatable and curable but remains a major public health concern. It is an advanced disease caused by *Plasmodium* parasite species, transmitted by female *Anopheles* mosquitoes. The world malaria burden increased from an estimated 245 million incidents in 2020 to 247 million cases in 2021 [1]. This surge is attributable, perhaps, to the disruption of services during the COVID-19 pandemic. The WHO African region contributes the greatest proportion (96 %) of the global malaria disease burden. Nigeria continues to bear the highest malaria burden (cases-26.8 %; deaths-31.9 %) worldwide with cases and death rates topping an all-time high [1]. Furthermore, the Commonwealth Malaria Report showed a relapsed and falling further off track of high burden countries that were already steadily reducing malaria; thus, the mortality rates in Commonwealth countries are now higher than in 2015, with the case incidence rising on a yearly basis, with Nigeria, in particular, being one of those with the highest malaria burden and impact in recent times [2]. While there are global, national estimates on malaria burden, a recent review of the malaria surveillance data in Benue State shows that findings may not be a real refection of the state's malaria burden [3]. This study therefore conducted a cross sectional survey to determine the prevalence of malaria as a jumping off point to further research on the local herbal remedies in use in the selected communities to combat malaria. Continued periodic generation of such vital baseline information on the prevalence rates will also enrich the national malaria database and provide evidence-to-decision (EtD) data for policy and practice geared towards reducing malaria disease burden. Findings surfacing from this investigation will serve to improve local specific malaria control interventions that can also be used in settings with similar malaria disease transmission evidence.

Materials and Methods

Study site

Benue State occupies a landmass of 34,059 square kilometres with a population of about 4,253,641 as at the 2006 census (Federal Republic of Nigeria [Frong], 2009) and by projection about 5,741,800 population. The State lies within longitude 7° 47` and 10° 0` East and Latitude 6° 25` and 8° 8` North; and shares boundaries with five other states namely: Cross-River to the south, Enugu to the south-west, Kogi to the west and Nassarawa to the north with Taraba to the east, The State also shares a common boundary with the Republic of Cameroun on the south-east. The south-eastern part of the State

adjoining the Obudu-Cameroun mountain range, however, has a cooler climate similar to that of the Jos, Plateau (Benue, 2014). Idoma and Tiv, are spoken predominantly. There are other ethnic groups, including Igede, Etulo and Abakwa. Jukun, Hausa, Akweya and Nyifon. The Tivs occupy fourteen (14) local government areas, while the Idomas and Igedes occupy the remaining nine (9) local government areas (Ado-Igumale, Agatu-Obagaji, Apa-Ugbokpo, Obi-Obarike-Ito, Ogbadibo-Otukpa, Ohimini-Idekpa-Okpiko, Oju-Oju, Okpokwu-Okpoga, Otukpo-Otukpo) which make up the total of twenty-three local government areas.

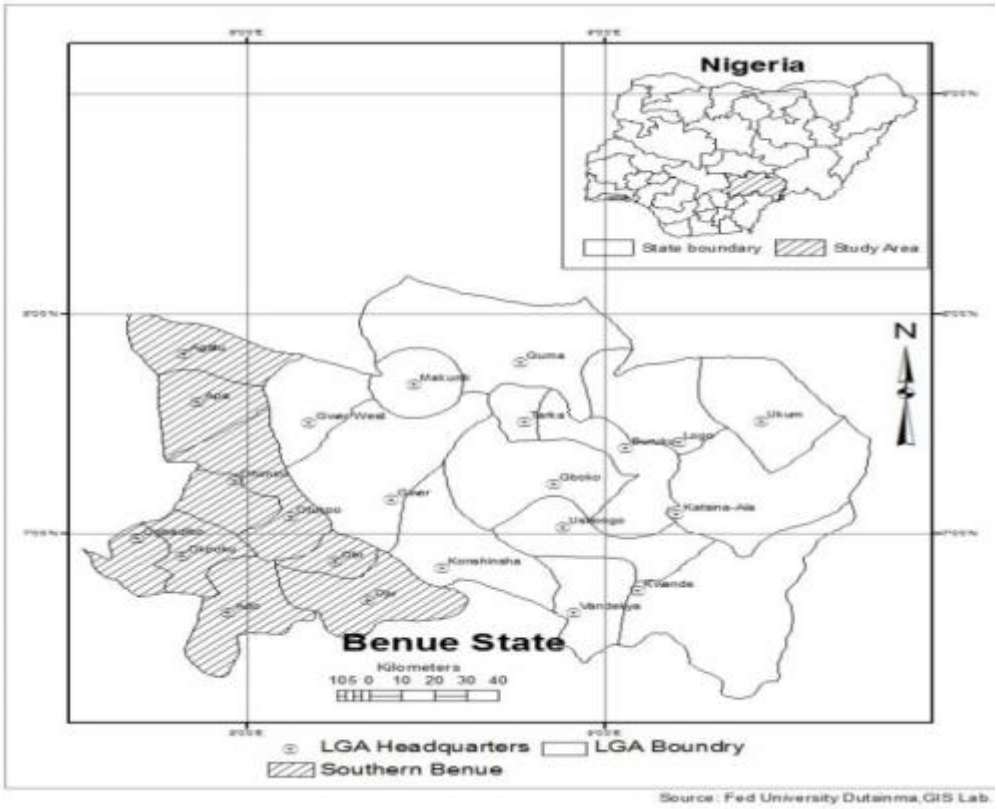

Fig 1: Map of Benue State Showing Benue South Senatorial Area

Study Design and Sampling Strategy

A cross sectional survey was carried out in the nine Local Government Areas (LGAs) in Benue South Senatorial Area. Well-known and frequently visited hospitals were selected in the study communities for the cross-sectional survey. The sample population included approximately 50 symptomatic willing participants visiting the malaria diagnostic labouratory from each of the nine Local Government Areas of Benue South.

Blood collection: Blood samples were collected under sterile condition by swabbing the area with 70% alcohol and air dried. Venous blood was collected from study subjects using 5 mL capacity disposable syringes fitted with needles and dispensed into specimen tubes. The specimen tubes were pre-lined with ethylene diamine tetra acetic acid (EDTA) tube, gentle mixing of the EDTA and blood was ensured. The EDTA tubes were appropriately labelled and samples transferred to the analysis section and used to prepare the slides. Thick and thin smears were prepared and stained with 10% [WHO microscopy manual] and examined under x100 oil immersion objective and paired x10 oculars. Slide validation was done by a staff of the **University medical center.**

Statistical analysis

Descriptive statistics, percentage and ranking were used to analyse the variables.

Ethical consideration on Human Subjects Research

The protocol and safety guidelines met the conditions of Institutional Review Board (IRB) of the Federal University of Health Sciences Otukpo (FUHSO-IRB) policies regarding experiments that use human subjects. Consequent upon this, ethical approval was given by the Health Research Ethics Committee(HREC) with the number: FUHSO-HREC 02/05/2023. Community entry

and advocacy visits were carried out, and informed consent of household, participants, or community heads and of all participants including minors and their guardians were all gotten and we worked with only those who gave their consent at each point in time. Participants were all selected randomly.

Results and Discussion

Survey outcome shows malaria is prevalent in all selected nine LGAs Benue South Senatorial Areas (Table 1). Ogbadibo LGA has the highest prevalence rate (78 %) followed closely by Obi LGA with 74 %. The least prevalent rates were recorded in Apa LGA (52 %) and Otukpo LGA (54 %). Highest Mean prevalence recorded was 39 % (Ogbadibo LGA) while the least is 26 % (Apa LGA). In all the LGAs more than half of the subjects screened tested positive to malaria. Of the 450 participants, 254 (56.44 %) revealed that a test was conducted to confirm malaria the last time their children had fever; while 185 (41.11 %) said no test was conducted; and 11 (2.45 %) could not remember whether a test was conducted or not. At the onset of malaria symptoms only 66 (14.66 %) took any action to combat the disease within the first 24h; 129 (28.67 %) took between 1-3days to respond while 255 (56.67 %) responded on the 4th day and even beyond day 4 as shown in (Table 2).

Table 1: Frequency and Percentage Distribution of Prevalence Rate of Malaria in the Study Locations

S/N	Prevalence Rate	N	P F (%)	NP F (%)	Remark
1	Oju	50	33 (66.00)	17 (34.00)	Prevalent
2	Obi	50	37 (74.00)	13 (26.00)	Prevalent
3.	Ohimini	50	34 (68.00)	16 (32.00)	Prevalent
4.	Ogbadibo	50	39 (78.00)	11 (22.00)	Prevalent
5.	Okpokwu	50	27 (54.00)	23 (46.00)	Prevalent
6.	Apa	50	26 (52.00)	24 (48.00)	Prevalent
7.	Otukpo	50	29 (58.00)	21 (42.00)	Prevalent
8.	Ado	50	31 (62.00)	19 (38.00)	Prevalent
9.	Agatu	50	32 (64.00)	18 (36.00)	Prevalent

P=Prevalent NP=Not Prevalent

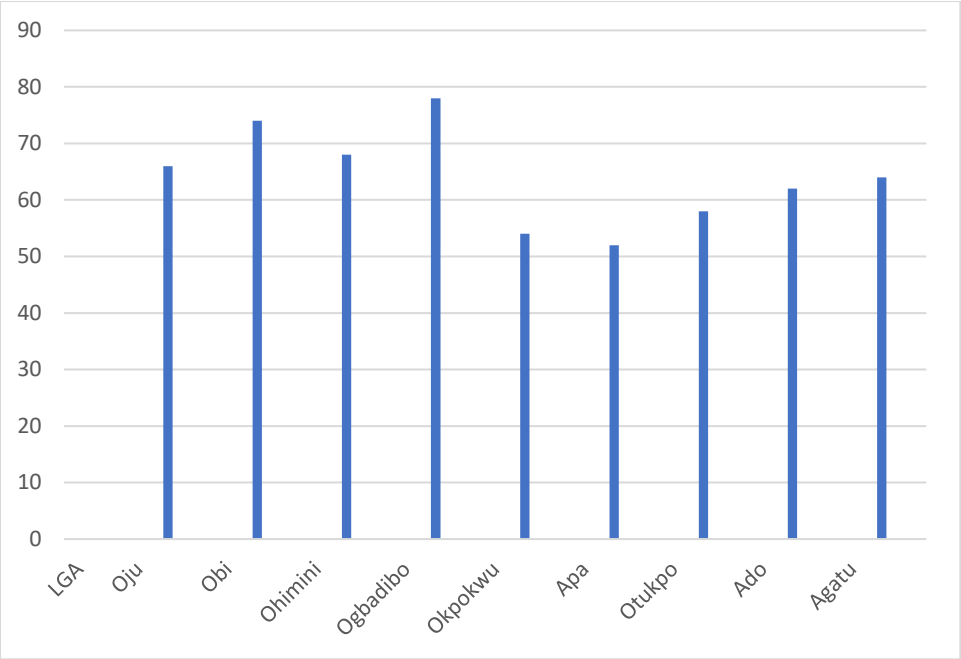

Fig 2: Prevalence Rate of Malaria in the Study Locations

Table 2: Frequency and Ranking Distribution of How Often and Action Taking by Peoples in the Control of Malaria

How Often	Oju Freq	Obi Freq	Ohimini Freq	Ogbadibo Freq	Okpokwu Freq	Apa Freq	Otukpo Freq	Ado Freq	Agatu Freq	Total Freq. n=450 (%)	Ranking
Less than 3 months	22	19	24	22	21	25	17	20	18	188 (41.78	1st
4-6 months	11	12	9	13	17	12	17	15	16	122 (27.11	2nd
7-9 months	10	8	6	8	7	8	9	8	9	73 (16.22	3rd
10-12 months	5	9	7	6	4	3	3	6	5	48 (10.67	4th
More than 12 months	2	2	4	1	1	2	4	1	2	19 (4.22	5th
How soon do you usually take action Within 24 hours	8	9	9	5	7	9	6	5	8	66 (14.66	3rd
1-3 days	10	13	12	14	18	12	12	17	21	129 (28.67)	2nd
After 4 days or more	32	28	29	31	25	29	32	28	21	255 (56.67)	1st
Action taken											
Go to hospital	10	9	16	13	13	12	17	15	11	116 (25.78)	3rd
Go to patent medicine dealer	24	21	19	21	20	19	17	19	21	181 (40.22)	1st
Treat at home	12	15	11	13	13	15	14	13	16	122 (27.11)	2nd
Go to faith homes/Prayer	4	5	4	3	4	4	2	3	2	31 (6.89)	4th

Discussion

Reduction of malaria disease burden is both a global and national priority as the morbidity and mortality rates remains unacceptably high. Nigeria bears the heaviest malaria burden (cases-26.8 %; deaths-31.9 %) in the whole world [4] and so tops the chat among the high impact high burden country. The data shown in table (1) shows the current trend in the burden of the disease in the study communities. In each of the study locations, more than fifty percent of the participants tested positive to malaria (52-78 %) with a mean prevalence rate of 39 % (Fig 2). This range is almost twice the Nigerian national prevalence rate for cases, which stands at 26.8 %. In comparison with zonal prevalence rates, the least prevalence (52 %) in the data set from the study locations is still higher than those presented by the latest 2021 Malaria Indicator Survey (MIS); where children in North West accounted for 29.8 %; North East (20.1 %); South East (18.7 %);South South(17.8 %); North Central (17.0 %) and South West (16.2 %) of which were positive for malaria according to microscopy, as compared with 17 % of children in North Central [5]. To prevent malaria morbidity and mortality, prompt and effective treatment is required; the outcome of investigations in the study locations shows that, at the onset of malaria fever, only 14.66 % will take a first step within 24hours to combat the disease. 28.67 % of the study participants will take between 1-3days, while 56.67 % will take action after 4days.The most effective way to tackle malaria is prompt diagnosis and treatment. In the absence of timely medical reponse a mild case of malaria may progress to complicated and sometimes fatal end [6]. Social communication should integrate and address the need to scale up their first action against malaria signs and symptoms so as to improve response time considerably.

Actualization of country level elimination and eventual eradication of the disease from the world at large, cannot be attained by a one size fits all strategy. The World Health Organization now advocates contextual community control measures presented in the *Global technical strategy for malaria 2016–2030 (*GTS) [7]. This framework, where properly articulated and applied may perhaps be the leap frogging needed to accelerate to zero malaria. In alignment to this global framework the National Malaria Strategic Plan [8] advocates evidence generation for decision making. Malaria endemicity varies from one locality to another so continued generation of local malaria prevalence data is needed to design locale specific high impact control interventions. This study provides baseline information for informed policy and practice.

Conclusion

The burden of malaria in the study locations are unacceptably high requiring scaleup of mixed interventions including but not limited to increased coverage of Long-Lasting Insecticidal Nets (LLINs), Indoor Residual Spraying (IRS), prompt case management enlightenment via radio jingles and routine campaigns and intermittent preventive treatment (IPTp) during pregnancy.

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Conflict of Interest

The authors wish to declare that there is no conflict of interest.

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