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Prevalence of Malaria among Children under the Age of Five: A Case Study of Ondo State, South West Nigeria

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Abstract:

The study examined the burden of malaria in children under the age of 5 years in Ondo State, Nigeria. Hospital data from all the 584 Primary Health Care Facilities (Public Health Centres) across the 18 Local Government areas of Ondo State were utilized. Malaria data were downloaded monthly from the DHIS platform covering January to December 2021 and subjected to analysis. Analysis was done primarily using a preformatted Microsoft Excel template. The analysis focused on monthly trends in malaria incidents among children under 5 years of age and was structured to show disparity across the 18 LGAs of the state. The result revealed a high burden of malaria among children under five years of age in Ondo State. Incidences were consistently above 30% throughout the year except in December. The seasonal and regional disparity was observed, and the factors responsible were discoursed. Questions for further research were raised regarding the attainment of sustainable development goals.

Keywords: Malaria, malaria in children, under five malaria, malaria prevalence

1. Background

Despite years of efforts directed at malaria control, the disease still poses a serious public health threat in endemic regions, with 229 million estimated reported cases in 2019 [12] and 405,000 attributable deaths, of which two-thirds (272,000) occurred in children under 5 years of age [11]. Deaths from malaria are caused mainly by the acute form of the disease, but much more is due to subtle effects, including anaemia. Malaria has been identified as the number one cause of morbidity. It accounts for about 38% of all outpatient illnesses and about 31% of all deaths in children under five [5], with almost all cases (97%) caused by *Plasmodium falciparum* [1]. According to the World Health Organization (WHO), the African Region accounted for 94% of all malaria deaths in 2018. Despite the relatively lower number of 180,000 deaths that year, the region was still responsible for 85% of the deaths recorded [11]. A systematic review assessing patterns of malaria variation by age with respect to severity, transmission intensity, and seasonality in sub-Saharan Africa found the clinical malaria burden to be higher in younger age groups. Hospital admissions were also higher among younger children, with higher mortality levels among infants [2].

Malaria is endemic in Nigeria, and the ecology of the Niger Delta region supports all-year transmission [1]. It remains one of the commonest reasons for admission into the children's emergency ward [2, 4]. Even with how high the incidence of malaria is in Nigeria, there is still the potential to miss cases of severe malaria based on clinical signs and symptoms alone [3]. Efforts to reduce the morbidity and mortality of malaria start with an accurate diagnosis of the condition. Therefore, the World Health Organization recommends that a parasitological confirmation of malaria should be made before treatment is commenced. Otherwise, the resources are unavailable, or the turnaround time for the test exceeds 2 hours [9-10]. Cases with a negative test result may then be reassessed for other causes of fever [9].

2. Methods

The study aggregated data from all the 584 Primary Health Care Facilities (Public Health Centres) across the 18 Local Government areas of Ondo State. At each center, hard copy hospital registers were maintained where data from each patient's clinic cards were entered by trained Health Management Information (HMI) officers. Data from the registers were summarized and validated monthly at the local government level to ensure data quality. The summarized data were

then entered into District Health Information System (DHIS 2.0) as a central database for the state health information system.

A monthly Data Quality Assessment (DQA) was conducted by independent monitors across the health facilities. The DQA process randomly selects patient's cards as the primary data source and traces data transmission from the cards to the register, from the register to monthly summary sheets, and ultimately to DHIS 2.0 to ensure data were transcribed correctly across the transmission chain.

For this study, Malaria data were downloaded monthly from the DHIS platform covering January to December 2021 and subjected to analysis. Analysis was done primarily using a preformatted Microsoft Excel template. The analysis focused on monthly trends in malaria incidents among children under 5 years of age and was structured to show disparity across the 18 LGA of the state.

The study covers the period from January 2021 to December 2021 to account for dry and rainy season incidents and determine how (if any) weather condition influences malaria prevalence among children under five years of age.

3. Results

3.1. Magnitude of Malaria

Overall, 122,906 cases of Malaria were confirmed at primary health facilities across the 18 LGAs of Ondo State in 2021. Confirmed Malaria cases were determined by positive malaria test results either by microscopy or Malaria Rapid Diagnostic Test (mRDT) methods. The primary entry point for malaria diagnosis at health facilities is fever presentation.

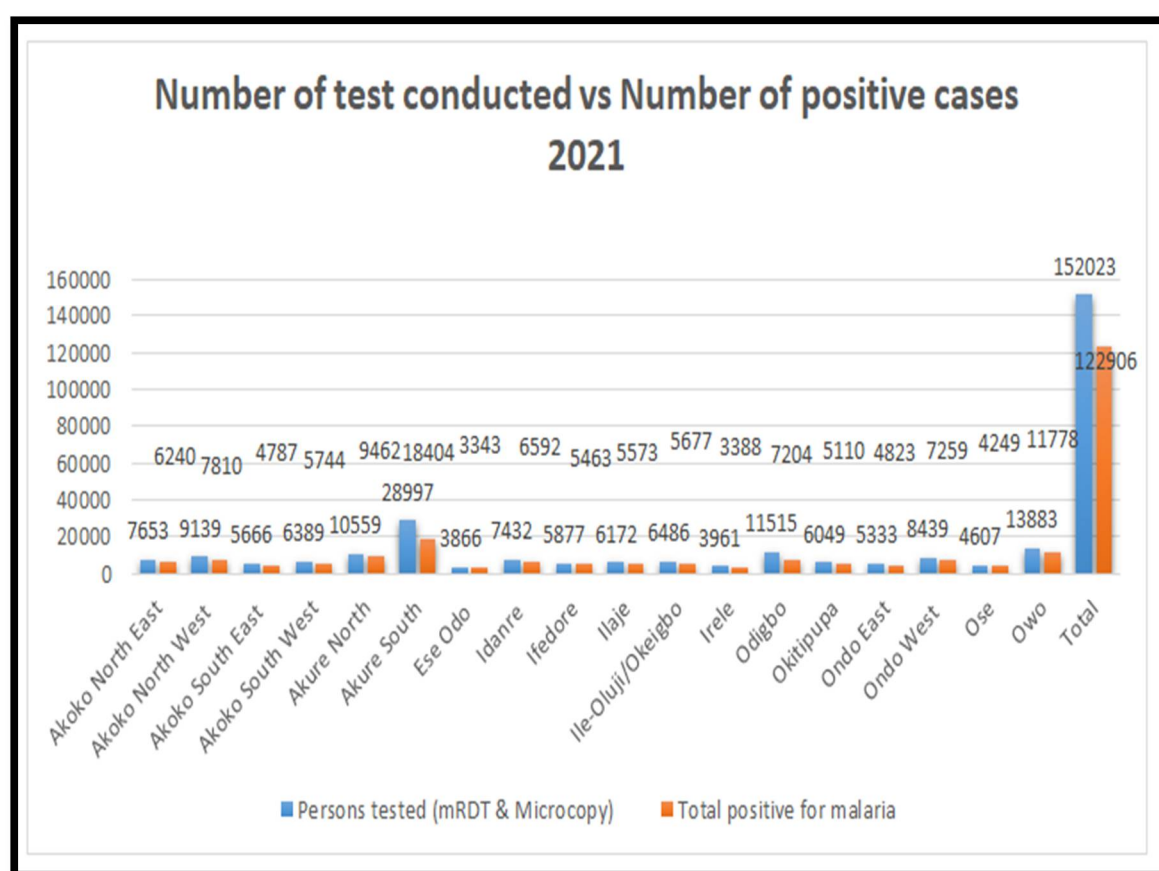


Figure 1: State Monthly Malaria Cases per LGA 2021

3.2. Prevalence of Malaria among Children under the Age of Five

There were 42,859 reported malaria cases in children under the age of 5 years in public health facilities across the state in 2021. This represented 34.87% of the total malaria cases reported within the period in the state. The charts below show the monthly under-five malaria trends and the distribution across the 18 LGAs of the state, respectively.

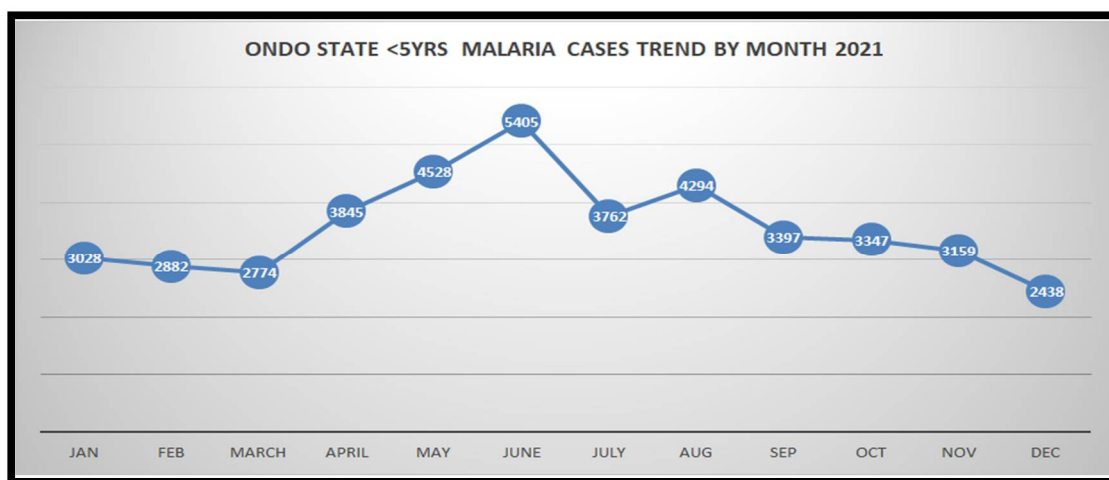


Figure 2: State Monthly <5YRS Malaria Trend 2021

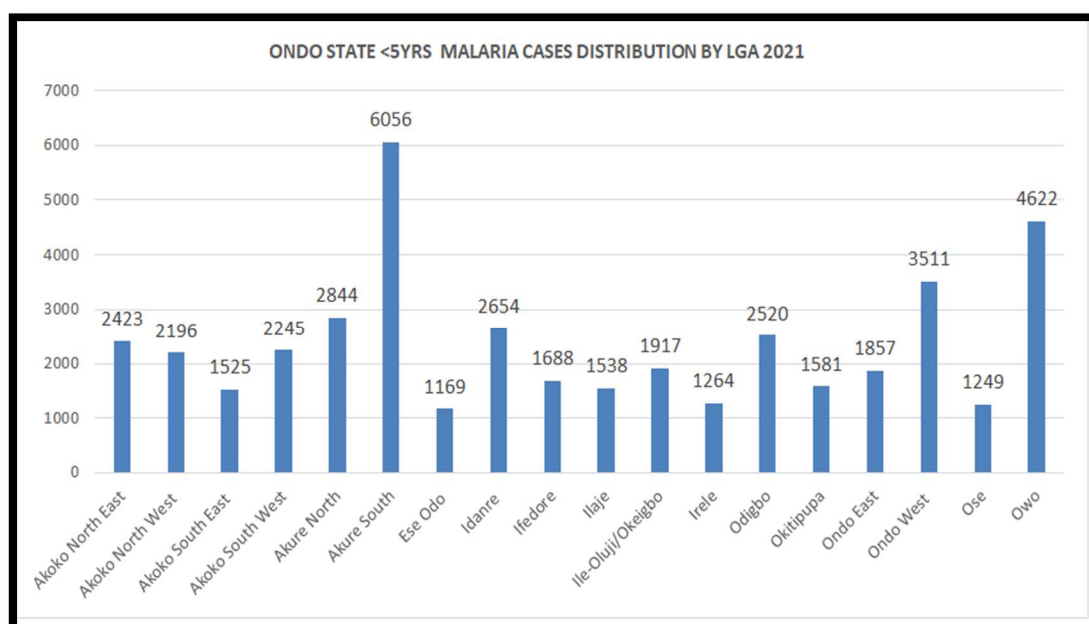


Figure 3: State <5YRS Malaria Cases per LGA 2021

The chart below shows the percentage of malaria cases in children under the age of 5 compared to the total malaria cases recorded monthly in Ondo state in 2021.

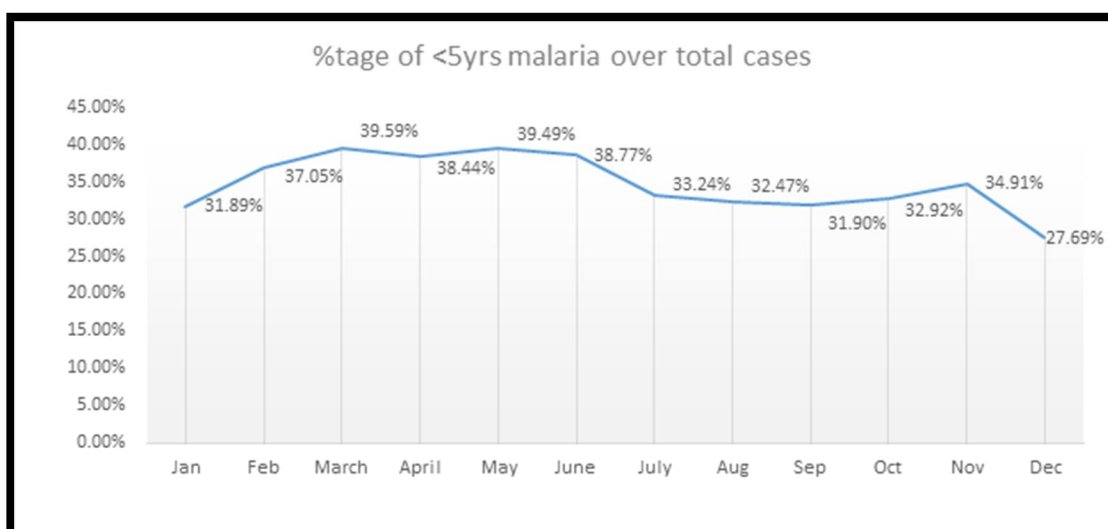


Figure 4: Percentage of State <5YRS Malaria Cases per LGA 2021

4. Discussion

Despite the concerted effort and huge financial commitment to malaria prevention and control, Ondo State still has high incidences of malaria in children under the age of 5. The prevalence of malaria in children under the age of 5 is consistently above 30% through the reporting period, except in December (Figure 4). The noticeable drop in incidence rate in December might be connected to the mass distribution of Insecticide Treated Net (ITN) within that month throughout the state [7].

The trend shows a spike in the number of cases from April 2021, cumulating in a peak by June 2021 (Figure 2). April has been documented as the onset of the rainy season in Ondo State, with peak rainfall by June and a slight spike in rainfall in August/September [8]. Rain creates water bodies and habitats for the proliferation of the vector 'mosquitoes', which, most likely, are responsible for the spikes seen from April to June and August. Therefore, efforts at vector control should be targeted towards those months rather than the dry season when stagnant water bodies have dried up and the possibility of vector breeding is minimal.

Looking at the spread of malaria cases among children under the age of 5 across 18 LGAs of the state (Figure 3), Akure South LGA has the highest incidences of such cases, with 6,056 reported cases in 2021, followed by Owo and Ondo West, respectively. Akure South LGA is the state capital, and the number of cases recorded might be connected to the improved health-seeking behavior within the capital city, Akure. However, what is responsible for the high incidences in Owo and Ondo West LGAs, which could be related to health-seeking behavior, is a subject for another research. Strangely, the riverine LGA of Ese Odo has the lowest incident rates at 1,169 cases (Figure 3), followed closely by the neighboring Irele LGA with 1,264 cases and far away Ose LGA at 1,249 cases. Factors that made LGAs like Idanre, Akure North and Akoko S/W with relatively dry lands recorded high malaria cases among children under 5. At the same time, the LGAs like Ese – Odo, Ilaje, Irele, and Okitipupa, which are either riverine LGAs or share boundaries with riverine LGAs, reported lower incidences.

4.1. Limitations of the Study

The study only utilized data from public primary health facilities, while cases recorded at the secondary and tertiary facilities and private hospitals were not included in the study.

5. Conclusion

The burden of malaria among children under 5 continues to be high, which might reflect child morbidity within the state. Stakeholders at all levels need to invest more in period-specific prevention and control measures to ensure the burden of malaria among children under 5. Investment in research efforts to fully understand the seasonal changes in incidence patterns and factors responsible for low reported incidences in areas that traditionally should report higher incidences is essential to understanding behavioral and geological factors that could aid the attainment of sustainable development goal three.

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