

(RESEARCH ARTICLE)



## Malaria cases and its trend among the outpatients who attended some hospitals and health centres in four towns in Ekiti State, Nigeria

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### Abstract

Monitoring the trend of malaria cases over a period of time is very useful to evaluate successes of malaria control programme in the endemic area. This study evaluated the trend of malaria cases from 2013 to 2022 from four major towns in Ekiti State, Nigeria. Clinical data involving malaria cases of outpatient visits to some hospitals and health centres from 2013 to 2022 in the four towns of Ekiti State were collected for statistical analysis. Data were analyzed with SPSS version 29 with probability value of  $< 0.05$  as significant. Results showed that 162,077 outpatients visited the selected hospitals and health centres of the four towns from 2013 to 2022. The overall percentage of malaria cases in the study area was 21.3 % with no significant difference ( $P = 0.001$ ) from the four towns. There was a gradual decrease in malaria cases from 2013 to 2021 among outpatients who were not pregnant women. Malaria cases among pregnant women however showed a slight increase from 2013 to 2022. If the control measures that caused a decline of malaria cases in this study area is sustained for a good period of time, there is tendency that malaria is eliminated from the area and possibly in the whole Ekiti State.

**Keywords:** Malaria; Malaria Cases; Outpatients; Ekiti; Trend

### 1. Introduction

Malaria is one of the leading diseases that cause morbidity and mortality in Nigeria. Seven (7) out of ten (10) people seen on the corridors of most hospitals and health centres in Nigeria have been reported to be suffering for malaria [1]. Malaria constitutes a great burden for people globally whereby children and pregnant women are the mostly vulnerable [2]. The transmission of malaria occurs throughout the year in Nigeria [3] and it is usually enhanced by the environmental factors [4]. Malaria is caused by protozoa parasite, *Plasmodium* in which four species have been identified as the major cause of infection in humans. The four species are *P. falciparum*, *P. ovale*, *P. malariae* and *P. vivax*. However, a particular species *P. knowlesi* which infects monkeys has been reported in the recent times to infect humans [5]. *Plasmodium* is transmitted by female *Anopheles* mosquitoes [6, 7] which are readily available in most habitats of Ekiti State in Nigeria [8, 9]. Among the species of *Anopheles* mosquitoes found in Ekiti State include *An. lesoni*, *An. funestus* and one notorious species, *An. gambiae gambiae* [9] that have been incriminated to be very effective in transmitting malaria parasites to humans [10]. However, the attitude and practice of most community people in Ekiti State enhance malaria transmission [11]. This has been one of the major reasons why most community people in Ekiti State are infected with malaria parasites thereby necessitating their visiting to the hospitals and health centres.

Measures recommended by World Health Organization to curb morbidity and mortality caused by malaria among people, especially pregnant women and children include use of insecticide-treated bed nets (ITNs), intermittent preventive treatment (IPT) with sulfadoxine-pyrimethamine (SP), and prompt diagnosis and treatment of infection. Such measures have led to preventive efforts, though with continued rise in the cost of malarial treatment to the

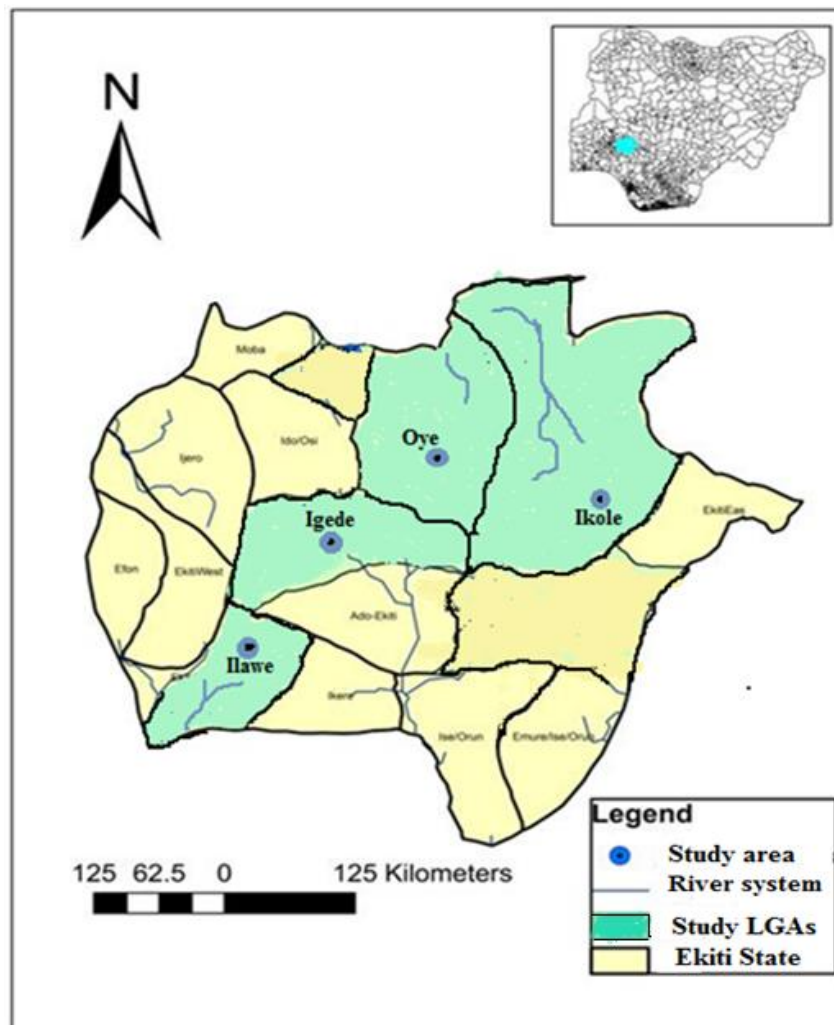
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individual and the nation [12, 13]. In the past, insecticide-treated bed nets (ITNs) were distributed by the Federal Ministry of Health to community people in many States of Nigeria through the intervention of Global Fund and Society for Family Health (SFH). However, there have been inconsistencies in the distribution of these ITNs in many States of Nigeria. For instance, ITNs were distributed to the people of Ekiti State last in 2014 [14]. The progress of these control measures need evaluation to determine the successes attained so far. This necessitated the design of this study with the objectives to evaluate the trend of malaria cases among the outpatients who attended hospitals and the health centres from 2013 to 2022 in four major towns in Ekiti State, Nigeria. The towns are Igede, Ikole, Ilawe and Oye.

## 2. Methods

### 2.1. Study area

The study area consists of four major towns in Ekiti-State. The towns are selected from four different Local Government Areas (LGAs) of the sixteen (16) LGAs that exist in Ekiti State. The selection of the LGAs is such way that it cut across the central part of Ekiti State. The towns are Igede in Irepodun/Ifelodun LGA, Ikole in Ikole LGA, Ilawe in Ekiti South West LGA and Oye in Oye LGA of Ekiti State (Figure 1). These towns are the headquarters of these selected Local Government Areas. The people in all the towns are majorly Yoruba ethnic group of Nigeria and their major occupation is farming. However, many others in the towns are civil servants and artisans. Ekiti is one of the 36 states of Nigeria. The population of the respective towns is presented in Table 1 according to 2006 population census and projection [15].



**Figure 1** Map of Ekiti State showing the study area

**Table 1** Population of the selected towns of the study area as projected to 2013 [15]

LGA	Town	Projected population
Ekiti South West	Ilawe	98,860
Oye	Oye	23,213
Ikole	Ikole	32,053
Irepodun/Ifelodun	Igede	36,701
Total		232,331

## 2.2. Data collection

Data were collected from some public hospitals and health centres of the selected towns of the study area. The data of outpatient visits from the year 2013 to 2022 were obtained from the record departments of the hospitals and the health centres of the selected towns of the study area. These data were subjected to statistics analysis.

## 2.3. Data Analysis

Data were analyzed with SPSS version 29. Statistics involved were descriptive and chi-square. A probability value ( $p$ -value) of  $p < 0.05$  was regarded as significant for the inferential statistics

## 3. Results

A total sum of one hundred and sixty-two thousand, and seventy-seven (162,077) records of outpatients were collected and examined from 2013 to 2022 from the General Hospitals and Primary Health Centres from the four selected towns of the study area (Table 2). The number of the outpatients (53.7%) who attended Primary Health Centres was higher than those (46.3 %) who attended General Hospitals in the study area. Highest number of outpatients (16.6%) was recorded in 2018 while the least (5.6) was recorded in 2022 (Table 2).

**Table 2** Summary of outpatients' data in the four Local Government Areas of Ekiti State

Parameter	Variables	Number of Outpatients	Percentage %
LGA	Ilawe	58189	35.9
	Oye	45637	28.2
	Ikole	35892	22.1
	Igede	22359	13.8
	Total	162077	100
Types of Health Care	General Hospital	75116	46.3
	Primary Health Centre	86961	53.7
	Total	162077	100
Year	2013	13243	8.2
	2014	13405	8.3
	2015	18248	11.3
	2016	12279	7.6
	2017	19672	12.1
	2018	26940	16.6
	2019	15801	9.7
	2020	16165	10.0

	2021	17208	10.6
	2022	9116	5.6
	Total	162077	100
Category of outpatients	< 5 with MP	8463	5.2
	> 5 with MP	25476	15.7
	pregnant women with MP	622	0.4
	Total number with MP	34561	21.3
	Total	162077	100

The overall percentage of malaria cases from the study area is 21.3 % (Table 3). However, the highest cases of malaria was recorded at Oye (30.8 %) while the least (14.2 %) was at Igede (Table 3). The results showed a progressive increase in the percentage of malaria cases among the different categories of outpatients along the order of the towns when view down the group as it is presented in Table 3. However, there was no significant difference ( $P = 0.001$ ) in the cases of malaria among the outpatients in the different towns of the study area. In general, the outpatients whose age were greater than five years had the highest cases of malaria (15.7 %) in the study area. The cases of malaria (27.3 %) among the outpatients who attended General hospitals was higher than those (16.2 %) who attended Primary Health Centres. However, there was no significant difference ( $P = 0.001$ ) in the cases of malaria among the outpatients of the two types of health cares (Table 4). The trend of malaria cases from 2013 to 2022 is shown in Figure 2. There was a gradual decrease in the cases of malaria from 2013 to 2021 among the outpatients who were not pregnant women in the study area (Figure 2). However the malaria cases suddenly shot up in 2022 among the outpatients who were older than five years. The cases of malaria among the pregnant women showed a slight increase from 2013 to 2022 (Figure 2).

**Table 3** Proportion of outpatients with cases of malaria infection in the study area

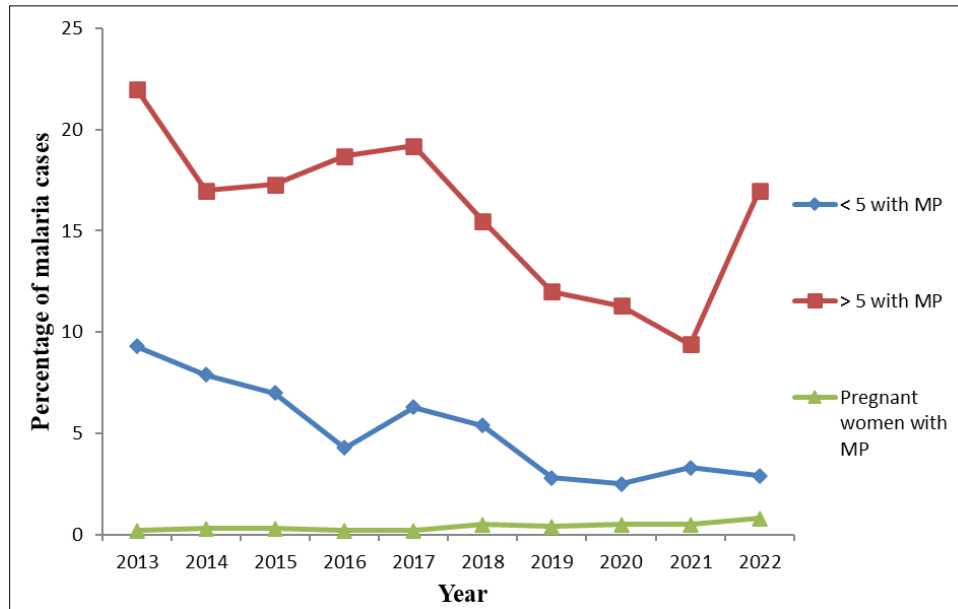
Local Government	Number examined	< 5 with MP	> 5 with MP	Pregnant women with MP	Total number with MP
Igede	22359	801 (3.6 %)	2314 (10.3 %)	60 (0.3 %)	3175 (14.2 %)
Ilawe	58189	2147 (3.7 %)	7825 (13.4%)	277 (0.5 %)	10249 (17.6 %)
Ikole	35892	1348 (3.8 %)	5512 (15.4%)	217 (0.6 %)	7077 (19.7 %)
Oye	45637	4167 (9.1 %)	9825 (21.5 %)	68 (0.1 %)	14060 (30.8 %)
Total	162077	8463 (5.2 %)	25476 (15.7 %)	622 (0.4 %)	34561 (21.3 %)

$P= 0.001$

**Table 4** Proportion of malaria cases among outpatients who attended different health cares

Type of Health Care	Number examined	< 5 with MP	> 5 with MP	Pregnant women with MP	Total number with MP
General Hospitals	75116	5347 (7.1%)	14857 (19.8%)	282 (0.4%)	20486 (27.3 %)
Primary Health Centres	86961	3116 (3.6%)	10619 (12.2%)	340 (0.4%)	14075 (16.2 %)
Total	162077	8463 (5.2%)	25476 (15.7%)	622 (0.4%)	34561 (21.3 %)

$P=0.001$



**Figure 2** Trend of malaria cases in the study area from 2013 to 2022.

#### 4. Discussion

The results of this study show that malaria occurs in the study area. Malaria is common febrile illness in all states of Nigeria. Various authors in Nigeria have reported malaria cases in many States of Nigeria [16, 17, 18, 19, 14]. The overall malaria cases in this study was 21.3 % which is relatively comparable to the results obtained in the past studies in Ekiti State. For instance, a prevalence of 26 % of malaria parasite infection was recorded during the dry season and 38 % during the rainy season in a community based study that involved some peri-urban and rural communities in Ekiti State [14]. The low cases of malaria recorded among the pregnant women in this study (0.4 %) was contrary to the past report of malaria cases where 56 % of malaria prevalence was recorded among the pregnant women in Ekiti State [9]. This large difference in the two studies could be linked with the different methods of data collection and analysis. While the data of the present study consisted of all outpatients including pregnant women, the data of former study was solely based on the pregnant women. However, the low cases of malaria recorded among the pregnant women in this study might be connected with good education given to the pregnant women whenever they go for antenatal cares. Health education during antenatal attendance has been identified to create knowledge about malaria transmission and thereby lowering the prevalence of malaria parasite infection [11]. The decline in malaria cases observed among the outpatients who were not pregnant women from 2013 to 2021 could be connected with the malaria control intervention in the State. There was a distribution of ITNs to the people of Ekiti State in 2014 [14]. If such an intervention is sustained for a good period of time, there is tendency that malaria infection is eliminated from Ekiti State. The factors leading to the sudden rise of malaria cases among the outpatients above five years from 2021 to 2022 need to be identified. This will provide information that may be useful in malaria control programme in the study area and in Ekiti State at large.

#### 5. Conclusion

This study establishes occurrence of malaria in the study area and also in Ekiti State. The cases of malaria in this study was lower than what have been reported in the past studies in Ekiti State. There appears a gradual decline in malaria cases from 2013 to 2022, but the tempo at which the malaria cases decrease need to be sustained. It is therefore follow that, if the trend at which malaria cases decreased in this study is sustained, there is possible that malaria is eliminated from the study area and possibly in the whole Ekiti State.

#### Compliance with ethical standards

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### *Disclosure of conflict of interest*

Author declares no conflict of interest.

### *Statement of ethical approval*

The ethical approval (MOH/EKHREC/EA/U/15) to conduct this study was obtained from the Ministry of Health and Human Services, Ado-Ekiti, Ekiti State, Nigeria.

### *Statement of informed consent*

Informed consent was obtained from all individual participants included in the study.

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