



# Suspected Malaria Outbreak Investigations in Baure LGA, Katsina State, Nigeria

Jalal-Eddeen Abubakar Saleh<sup>1</sup>, Abdullahi Saddiq<sup>1</sup>, Haruna Ismaila Adamu<sup>1</sup>, Rex Mpazanje<sup>1</sup>, Bala Mohammed Audu<sup>2</sup>

<sup>1</sup>Communicable and Non-Communicable Diseases, World Health Organization, Abuja, Nigeria

<sup>2</sup>National Malaria Elimination Programmes, Abuja, Nigeria

Email: salehj@who.int

**How to cite this paper:** Saleh, J.-E.A., Saddiq, A., Adamu, H.I., Mpazanje, R. and Audu, B.M. (2019) Suspected Malaria Outbreak Investigations in Baure LGA, Katsina State, Nigeria. *Open Access Library Journal*, 6: e5512.

<https://doi.org/10.4236/oalib.1105512>

**Received:** May 31, 2019

**Accepted:** July 1, 2019

**Published:** July 4, 2019

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## Abstract

**Background:** Malaria, a disease that is endemic in Nigeria and contributing up to 25 per cent of infant mortality and 30 per cent of under-five mortality, is among the 17 per cent of the global burden of infectious diseases. Nigeria, which has 27 per cent malaria prevalence, is among the top eleven high-burden countries globally. In September 2018, a team headed by the World Health Organisation in Nigeria investigated a suspected malaria outbreak in Baure local government area of Katsina state northwestern Nigeria. **Methods:** We reviewed clinical records of 30 patients who were presented to the health facility with febrile illness, investigated and treated from 10<sup>th</sup>-24<sup>th</sup> September 2018. The data used during the study included age, sex, residential address, signs and symptoms. A cross-sectional survey was carried out in the Epicentre of the suspected outbreak to assess the knowledge of the caregivers on malaria control measures and look at the coverage of the seasonal malaria chemoprevention (SMC) running in the area for the third year. The data were analysed using Excel. **Results:** Out of the 30 reported cases, 27 (90%) were tested positive for RDT and 3 (10%) were tested negative. The age range of the cases was from three months to 70 years (median: 14 years), sex distribution F 16 (59%) and M 11 (41%) and CFR 3.7% (1/27). An SMC coverage survey shows that out of 86 HHs, 79 (91.86%) had SMC cards for the last two cycles of 2018. On the knowledge of caregivers on malaria preventive measures, 80% (8/10) were aware that mosquitoes transmit malaria, and 100% (10/10) had knowledge on at least one preventive measure against the disease. **Conclusion:** Although government commitment to malaria control is commendable, there is the need for state malaria control programme to intensify health education programmes on environmental hygiene, to strengthen awareness campaigns on the available malaria interventions and to improve access to the interventions especially for the more vulnerable members of the community.

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## Subject Areas

Infectious Diseases, Public Health

## Keywords

Malaria, Outbreak Investigations, DSNO, Rapid Diagnostic Test, Surveillance, Patent Medicine Vendors, Artemisinin Combination Treatment, IPTp, Katsina State, Baure Local Government, Nigeria, WHO

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## 1. Introduction

Malaria, a disease that is preventable and curable, is a vector-borne parasitic in nature and transmitted by the female Anopheles mosquito. Although *A. gambiae* is the predominant species across the country, the most prevalent species in the north is *A. arabiensis* [1]. Out of the five different species of the *Plasmodium* parasite (*P. falciparum*, *P. ovale* and *P. malariae*, *P. Knowles*, and *P. vivax*) that causes malaria across the globe, *P. falciparum* is the most prevalent in Nigeria and responsible for more than 95 per cent of all malaria infections. However, *P. malariae* is also isolated in children with mixed infections [1].

Baure is one of the 34 LGAs in Katsina state and considered a high-risk using the EPI ranking (routine immunisation coverage, supplemental immunisation campaigns, and AFP surveillance). Baure has a target population of 281,481 (2016 est.), and twelve wards, and also shares an international border with the Niger Republic to the north. The LGA had a circulating vaccine-derived poliovirus (cVDP) reported in August 2018 and had conducted three rounds of an outbreak response vaccination campaign to contain the virus [2].

The global fight against malaria has significantly resulted in the decline in mortality by 62 per cent between 2000 and 2015, and in estimated 20 million fewer malaria cases in 2017 compared to 2010, the data for the period 2015-2017 highlighted no significant progress made [3]. With the African continent contributing over 200 million malaria cases in 2017, Nigeria has about 25% of the global cases; the other high burden countries included the Democratic Republic of the Congo (11%), Mozambique (5%), India (4%) and Uganda (4%) [3].

In Nigeria, statistics has that the prevalence of malaria has declined from 42% in 2010 to 27% in 2015, and in the northwestern zone of the country, the prevalence has dropped from 48 per cent to 37 per cent between 2010 and 2015 [1] [4]. Katsina state, where the outbreak occurred, has a prevalence of 27.8 per cent ranking seventeen out of the 36 states including Abuja in the country [1].

The global fight against malaria represents one of public health's greatest triumphs as mortality caused by the disease plummeted by nearly 60% [5]. Although many countries across the globe have significantly reduced the burden of malaria with the recommended core prevention tools, still there exist significant gaps in coverage especially in low-income countries [3] [6] [7] [8] [9].

In sub-Saharan Africa, 663 million cases of malaria were prevented between 2010 and 2015 as a direct result of the scale-up core malaria interventions with insecticide-treated nets having the most significant impact averting about 69% of cases of malaria [3] [4] [6] [7] [8] [9]. However, 43% of people who are at risk of malaria are not protected from mosquito bites with the LLINs or indoor spraying of insecticides. Similarly, 69% of pregnant women lack access to the recommended minimum of three doses of intermittent preventive treatment in pregnancy (IPTp) during antenatal visits [3] [4] [6] [7] [8] [9]. Thus, for country programmes to achieve malaria elimination, there is need for adherence to the critical preventive measures against malaria which include the use of long-lasting insecticide-treated nets (LLINs), indoor residual spraying (IRS), use of preventive medicines in the most vulnerable groups (IPTp, IPTi and SMC) and improve access to these critical tools [10] [11].

## 2. Method

The outbreak investigation team, headed by the national professional officer from the World Health Organization, held a meeting with the leadership of the Baure LGA PHC. The team informed the LGA team that they are on the ground to conduct an outbreak investigation for the unusual fever cases from Lallu settlement of Yanmaulu ward as reported by the disease surveillance and notification officer (DSNO) of the LGA. The objectives of the mission include; to verify the existence of the outbreak, to determine the extent of the outbreak (and where applicable the risk factors for the outbreak), to support case management to minimise deaths and disability from the outbreak, to institute preventive/control measures, to collect blood samples for further laboratory investigations/confirmation (where necessary), and to assess the local capacity and identify additional requirements to contain the outbreak.

The investigation team reviewed the line list of the reported fever cases between 10th-24th September 2018 and attended to by the clinicians at Yanmaulu PHC, which serves the community.

The data collected during the investigations included age, sex, residential address, signs, and symptoms, RDT status, treatment and outcome. Using the case definition for malaria and by the WHO guidelines, any febrile illnesses that tested positive using the malaria RDT or microscopy were considered as confirmed malaria. The record at the health facility shows that the confirmed malaria cases were treated using the recommended artemisinin combination drugs (ACTs). However, the cases tested negative were managed in line with their illnesses.

Similarly, and considering the fact that the LGA has been conducting seasonal malaria chemoprophylaxis (SMC) for the 3rd year running, the team did a quick coverage survey involving ten households (HHs) in the epicentre of the suspected outbreak; this is to validate the SMC cards of the HHs in the last two to three rounds of 2018. The outcome of the quick survey prompted the team to extend the SMC coverage to eighty-six additional HHs. Also, a simple question-

naire was applied to ten HHs to assess the knowledge of the caregivers on malaria control. The data from the surveys were collated and analysed using simple Excel.

### 3. Result

It could be seen in **Figure 1** that out of the thirty fever cases who presented at the health facility, 27 (90%) tested RDT positive and 3 (10%) were negative. With only one recorded death (CFR 3.7%; female) out of the 27 RDT positive cases and in the age group 5 - 14 years, the highest number of cases was in the age groups 1 - 4 years (51.85%) and 5 - 14 years (44.44%). **Figure 2** shows gender distribution of the cases with females 16 (59%) and males 11 (41%).

The presenting complaints of the patients were fever and vomiting, an occasional passage of loose stools and febrile convulsions. However, there was no any history of jaundice, bleeding from the gums, or epistaxis reported. The malaria test conducted by the clinicians was the routine RDTs, and the positive cases treated using an artemisinin-based combination (ACTs) and antipyretics.

#### SMC coverage survey

The result of the initial SMC coverage survey in ten HHs in the settlement shows that 80% of the caregivers (8/10) had SMC cards for the last two to three cycles. Similarly, the result of the extended coverage survey covering additional 86 HHs revealed that 79 (91.86%) had SMC cards for the last two cycles of 2018

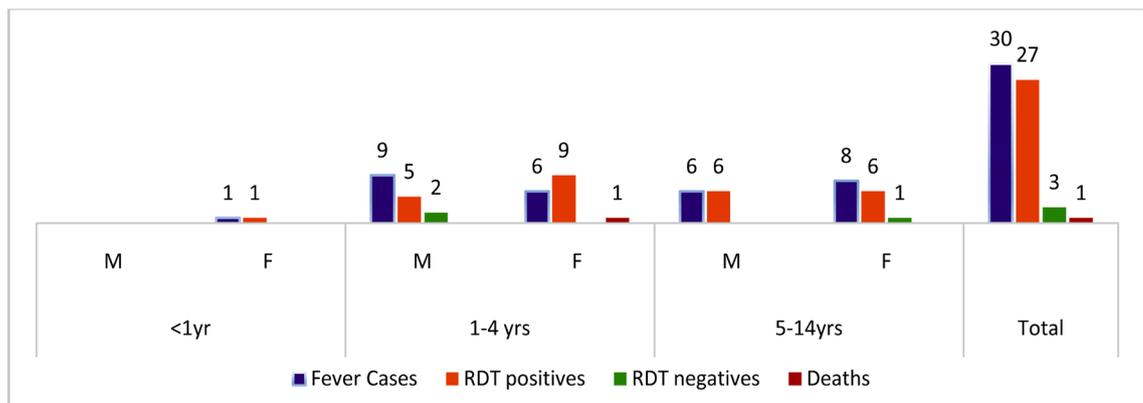


Figure 1. Frequency distribution of cases.

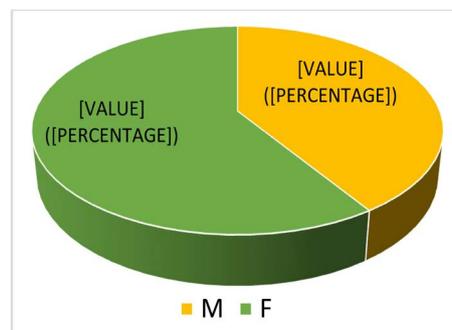


Figure 2. Gender distribution of RDT positive cases.

while 7 (8.14%) failed to short of that. The reasons given by the 7HHs who were unable to produce the SMC cards include: not aware of the SMC intervention 5 (71.42%), the child taking sulphur drug while the team visited the house 1 (14.29%), and no felt need 1 (14.29%).

#### *Knowledge of caregivers on malaria*

This survey reveals that 80% (8/10) of the caregivers were aware that mosquitoes transmit malaria, 100% (10/10) knew at least one preventive measure against malaria [only 20% (2/10) mentioned LLIN as a preventive tool], and 80% (8/10) were aware of ACTs as the recommended treatment [20% (2/10) mentioned CQ as the drug of choice].

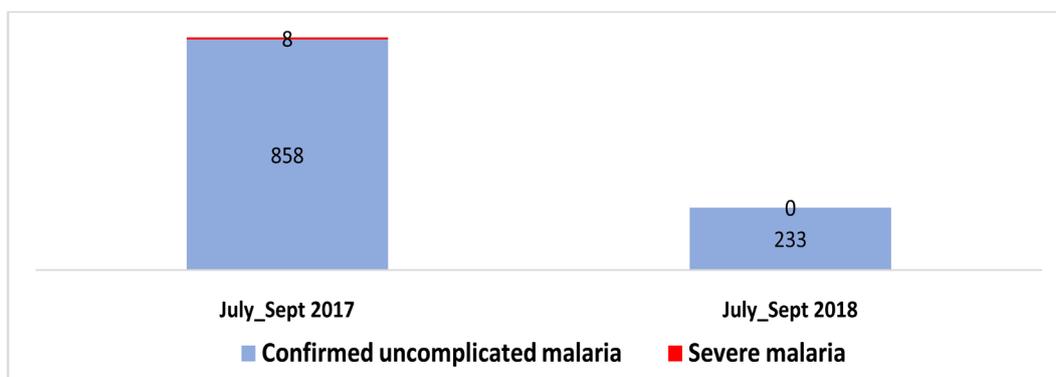
#### *Malaria trend from the DHIS*

The team downloaded the DHIS data for the third quarter of 2017 and 2018 for comparison and to look at the trend of reported RDT positive fever cases. The result shows that there are 858 confirmed uncomplicated malaria and eight severe malaria in Q3 of 2017 in comparison with 233 confirmed uncomplicated malaria and zero (0) severe malaria reported same period in 2018 (**Figure 3**).

## 4. Discussion

Studies indicated that outbreaks could arise due to the lack of effective interventions and surveillance among neglected populations, inappropriate diagnoses and treatments and transition phases of support programmes for malaria intervention [12]. Similarly, in another study, living at nearby natural and human-made vectors breeding sites, poor utilisation of ITN, unproductive mosquito bites and less/low participation of communities on preventive measures might contribute to an outbreak of malaria [13].

However, this suspected malaria outbreak investigation showed that it was not a true outbreak but an increased level of awareness of malaria in the community. This outcome is consistent with the findings in a study conducted in Kano and Sokoto states in 2016 which showed that respondents had good levels of knowledge and attitudes regarding malaria transmission, symptoms, and prevention [11] [14].



**Figure 3.** Trend of confirmed uncomplicated malaria and severe malaria in Q3 2017 and Q3 2018 from the DHIS.

Similarly, looking at the trend as shown in the DHIS data of confirmed uncomplicated malaria and severe malaria for Q3 2017 and Q3 2018, the remarkable reduction in the malaria cases in 2018 could be attributed to the ongoing SMC intervention in the LGA as well as other interventions put in place by the stakeholders and RBM partners.

The limitation of this study was that those interviewed to assess their knowledge of malaria preventive measures were not necessary patients who received treatment at the health facility during the malaria outbreak.

The recommendations, based on the outcome of this investigations, include the need for state malaria control programme to sustain the current level of SMC intervention in Baure LGA and the state at large, ensure availability and accessibility of malaria interventions at the PHCs, and intensify on SBCC activities for the community to maximally benefit from the long-lasting insecticidal treated nets (LLINs) issued out at the recently concluded replacement campaign in the state.

There was no conflict of interest associated with this study.

The outbreak investigation and analyses of the result were part of the technical assistance rendered by the World Health Organisation.

The authors acknowledge with gratitude the cooperation of officials from the Katsina State Malaria Programme.

## Conflicts of Interest

The authors declare no conflicts of interest regarding the publication of this paper.

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