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# Prevalence of Malaria Parasite Among NYSC Corp. Members, Staff, Military and Paramilitary who Reported at NYSC Orientation Camp Amada in Gombe State

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## ABSTRACT

The study was carried out among NYSC members, staffs, military and paramilitary who reported at the camp clinic with clinical presentation of malaria in temporary NYSC orientation camp Amada in Gombe state. All the process of sample collection and testing took place over a period of 3 weeks of activities in the NYSC camp. 124 patients blood samples tested for malaria parasite in the NYSC camp clinic, 22 were positive giving a prevalence of 17.8%. Out of the 124 patients tested, 49 were males while 75 were females. Of the 49 males tested, 14 were positive giving a prevalence of 28.6% among males. Of the 75 females tested, 8 were positive giving a prevalence of 10.7% among females. Of the 124 patients tested, 113 were NYSC members of which 18 were positive giving a prevalence of 15.9% among NYSC members, 2 were military officers with both positive for malaria giving a prevalence of 100%, 4 were paramilitary officers of which 1 was positive giving a prevalence of 25%, 5 were NYSC staffs of which 1 was positive for malaria giving a prevalence of 20%.

**Key word:** Malaria parasite, NYSC, Gombe, Military, Paramilitary, RDT.

## INTRODUCTION

Malaria is a mosquito-borne infectious disease affecting humans and other animals caused by parasitic protozoan's (a group of single-celled microorganisms) belonging to the Plasmodium type. Malaria causes symptoms that typically include fever, fatigue, vomiting, and headaches. In severe cases it can cause yellow skin, seizures, coma, or death (Caraballo, 2014) Symptoms usually begin ten to fifteen days after being bitten. If not properly treated, people may have recurrences of the disease months later (WHO, 2014).

Malaria parasites belong to the genus Plasmodium. There are more than 100 species of Plasmodium, which can infect many animal species such as reptiles, birds, and various mammals. (CDC, 2016). Five species of Plasmodium can infect and be spread by humans. Most deaths are caused by *P. falciparum* because *P. vivax*, *P. ovale*, and *P. malariae* generally cause a milder form of malaria. The species *P. knowlesi* rarely causes disease in humans (Caraballo, 2014). The disease is most commonly transmitted by an infected female Anopheles mosquito. The mosquito bite introduces the parasites from the mosquito's saliva into a person's blood. The parasites travel to the liver where they mature and reproduce (WHO, 2014).

Malaria affects 3.3 billion people, or half of the world's population, in 106 countries and territories. In 2015, there were 214 million cases of malaria worldwide resulting in an estimated 438,000 deaths, 90% of which occurred in Africa. Rates of disease have decreased from 2000 to 2015 by 37%, but increased from 2014 during which there were 198 million cases. (WHO, 2015). Malaria is the second leading cause of death from infectious diseases in Africa, after HIV/AIDS. Almost 1 out of 5 deaths of children under 5 in Africa is due to malaria. (USEN, 2011).

WHO estimates 216 million cases of malaria occurred in 2010, 81% in the African region. (USEN, 2011). WHO estimates there were 655,000 malaria deaths in 2010, 91% in the African Region, and 86% were children under 5 years of age (USEN, 2011). Malaria is the 3rd leading cause of death for children under five years worldwide, after pneumonia and diarrheal disease (Gollin D and Zimmermann C, 2007).

Malaria is a major public health problem in Nigeria where it accounts for more cases and deaths than any other country in the world. Malaria is a risk for 97% of Nigeria's population. The remaining 3% of the population live in the malaria free highlands. There are an estimated 100 million malaria cases with over 300,000 deaths per year in Nigeria. This compares with 215,000 deaths per year in Nigeria from HIV/AIDS. Malaria contributes to an estimated 11% of maternal mortality (USEN, 2011).

This study looks at the prevalence of Malaria among National Youth Service Corps (NYSC) members who reported at the camp clinic during a three weeks orientation camp program which is one of the cardinal pillars of the NYSC scheme. The National Youth Service Corps (NYSC) is an organization set up by the Nigerian government to involve the country's graduates in the development of the country. There is no military conscription in Nigeria, but since 1973 graduates of universities and later polytechnics have been required to take part in the National Youth Service Corps program for one year. This is known as national service year. "Corp" members are posted to cities far from their city of origin. They are expected to mix with people of other tribes, social and family backgrounds, to learn the culture of the indigenes in the place they are posted to. This action is aimed at bringing about unity in the country and to help youths appreciate other ethnic groups. There is an "orientation" period of approximately three weeks spent in a military controlled boot "camp" away from family and friends. There is also a "passing out ceremony" at the end of the year and primary assignment followed by one month of vacation (A Cup of Tea From Yakubu Gowon, 2015)

Due to unavailability of materials for microscopic examination of blood films for malaria parasites on the camp, commercial antigen detection tests known as the Histidine Rich Protein 2 (HRP2) Malaria Rapid Diagnostic Tests (MRDT) kit was used. Unlike microscopy, RDTs are less sensitive, are not able to estimate parasite density, cannot indicate when schizonts of *P. falciparum* are present in peripheral blood and cannot provide accurate species identification particularly for non-*P. falciparum* infections because only *P. falciparum* produces HRP2 antigens (Monica, 2009)

WHO publication showed that Malaria RDT results can also be misleading such that a negative RDT result does not always exclude malaria with certainty as there may be insufficient parasites to give a positive result. This may occur when a test that is not sufficiently sensitive is being used, particularly in areas of low malaria transmission. In addition, the RDT may have been damaged, this may occur when tests have been exposed to higher than recommended temperatures during transportation or storage, or to humid conditions before use. Enzyme-based RDTs are more susceptible to damage by heat and humidity than HRP 2- based RDTs. Illness may also have been caused by other species of malaria parasite other than *P. falciparum* which the HRP2 RDT is not designed to detect. Furthermore, the use of HRP 2 test which is not able to detect the variant of HRP 2 produced by the strain of *P. falciparum* causing the malaria. There might also be difficulty reading test line (very faint) due to high parasitemia which may be reported falsely as a negative result (Monica, 2009).

A positive RDT result does not always signify malaria illness because antigen may sometimes be detected after the infecting parasites have died following treatment or there is a persistence of malaria gametocytes which do not cause illness. In addition, the presence of other substances in the blood may occasionally produce a false positive result, for example heterophile antibodies or less commonly, rheumatoid factor affecting both HRP 2 and enzyme-based RDTs. Furthermore, the presence of parasites does not always signify clinical malaria in individuals with high immunity because there may be other causes for the fever (Monica, 2009)

## METHODOLOGY

### Study Population

The study was carried out among NYSC members, staffs, military and paramilitary who reported at the camp clinic with clinical presentation of malaria in temporary NYSC orientation camp Amada in Gombe state. A total number of 124 patient samples were tested for malaria of which 49 of the patients were males while 75 were females. All the process of sample collection and testing took place over a period of 3 weeks of activities in the NYSC camp

### Ethical Consideration

Ethical clearance and approval was obtained from the NYSC camp officials before commencement of camp clinic activities which served as the source of data collection.

### Sample Collection

From each subject, a capillary blood was aseptically collected from the thumb using a lancet to prick and a capillary tube to aspirate after disinfection of the area of collection.

### Procedure of Assay

Each RDT cassette was carefully opened and brought out of the pouch and placed on a clean flat surface. One (1) drop of blood collected in a capillary tube was introduced into the sample pad on the cassette and 2 drops of buffer were introduced into the buffer port. Results were read after 15minutes.

### Statistical Analysis

Results obtained from sample analyses were subjected to general descriptive analysis

## RESULTS

Of the 124 patients blood samples tested for malaria parasite in the NYSC camp clinic, 22 were positive giving a prevalence of 17.8%.

**Table 1:** shows the prevalence of malaria among patients who reported to the camp clinic in relation to sex. Out of the 124 patients tested, 49 were males while 75 were females. Of the 49 males tested, 14 were positive giving a prevalence of 28.6% among males. Of the 75 females tested, 8 were positive giving a prevalence of 10.7% among females

**Table 2:** shows the prevalence of malaria among the patients in relation to their status on the NYSC camp. Of the 124 patients tested, 113 were NYSC members of which 18 were positive giving a prevalence of 15.9% among NYSC members, 2 were military officers with both positive for malaria giving a prevalence of 100%, 4 were paramilitary officers of which 1 was positive giving a prevalence of 25%, 5 were NYSC staffs of which 1 was positive for malaria giving a prevalence of 20%

**Table 1: Prevalence of Malaria in Relation to Sex of Patients**

Sex	Number Tested	Number positive	percentage positive (%)
Male	49	14	28.6%
Female	75	8	10.7%
<b>Total</b>	124	22	17.8%

**Table 2: Prevalence of Malaria in Relation To Status on NYSC Camp**

Status	Number Tested	Number positive	percentage positive (%)
<b>NYSC members</b>	113	18	15.9%
<b>Military Officers</b>	2	2	100%
<b>Paramilitary Officers</b>	4	1	25%
<b>NYSC Staffs</b>	5	1	20%
<b>Total</b>	<b>124</b>	<b>22</b>	<b>17.8%</b>

### Characteristics of the Study Population

A total number of 124 patients were involved in the studies of which 113 were NYSC members, 2 military officers, 4 paramilitary officers and 5 NYSC staffs. The NYSC members are university graduates trained in different universities across the country and abroad. They have varying ethnic and religious background and different life styles that affect healthy living. Due to their level of education they are considered to be enlightened regarding health issues. They all fall in the age bracket of 18-30 years. The military and paramilitary officers are members of the Nigerian military and paramilitary responsible for giving NYSC members military drills and discipline during the period of their stay on camp. The NYSC officials are responsible for managing all NYSC activities on camp.

The living hostels on camp were not well equipped to prevent breeding of mosquitoes. Majority of NYSC members were not sleeping under bed net since it was not provided by NYSC.

### DISCUSSION

Maintaining and improving on current gains made on malaria is imperative for an effective control of the disease, especially in high endemic countries. Nigeria is made up many cultural diverse settlements and community and is essentially segmented into 6 geopolitical zones (Southwest, Southeast, South south, North central, Northwest and Northeast). Each of these zones has its own peculiar geographic and weather features and so requires strategic, well planned control intervention methods and tools targeted at individual settings in order to achieve the projected goal of 50% reduction in burden of malaria (National population commission, 2009).

A total prevalence of 17.8% (22 out of 124 samples) was established. This is similar to the prevalence of 14.7% reported for Ibeshe community in Ikorodu, Lagos state (Southwest) by Aina et al. This prevalence is lower than the prevalence reported among patients attending General Hospital in Makarfi, Kaduna state North Western Nigeria by Millicent and Gabriel in 2015 which gave a prevalence of 35.7%. It is also lower than the prevalence obtained in Abia (Southeast) and Plateau (North central) states in Nigeria who reported prevalence of 36.1% and 36.6% respectively (Noland et al, 2014). The difference between our study and that of Noland et al, Millicent and Gabriel might be because our study was conducted during the dry season, rather than in the raining season when malaria transmission is much higher. Another reason might be the age bracket of the population under studies; our studies was focused on the age bracket of 18-30 years of age while Noland et al, Millicent and Gabriel's work cut across all age groups including infants (<5years) who are the most vulnerable thereby increasing malaria burden prevalence in their studies because WHO maintains that children less than 5 years are more at risk of the disease because they may not have developed protective immunity against the disease and its most severe form (WHO 2010). Another reason might be the level of awareness of preventive measures between the two different populations under studies; our studies focused on graduates with high level of awareness whereas their studies cut across a population with different educational status and level of awareness. Another reason for the difference might be due to the laboratory diagnostic technique; RDT which is less sensitive was used in our studies while they used more sensitive diagnostic techniques like microscopy and PCR.

### LIMITATIONS

The study was not able to gather information on the number of patients using ITNs in their hostels, which could have assisted in accounting for the high prevalence of the disease seen in the study. The study did not generate information on different socio demographic characteristics of patients which would give a better idea of the factors exposing patients to malaria. Another limitation of the study is the low sensitivity of RDT which was the only laboratory diagnostic tool used.

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