



Prevalence of Malaria among Patients Attending Primary Health Care Clinic Garaku, Nasarawa State, North Central Region of Nigeria

J. C. Ndubuisi^{1*}, Mohammed, Aisha² and Rizwan A. Ansari³ and Uche Ifeoma Ude⁴

¹*Department of Medical Science Laboratory, Federal University, Lafia Nasarawa State, Nigeria.*

²*Department of Pharmaceutical Microbiology and Biotechnology, Faculty of Pharmaceutical Sciences Bayero University, Kano, Nigeria.*

³*Department of Biochemistry, Yobe State University Damaturu, Nigeria.*

⁴*Department of Microbiology, Gregory University, Uturu Abia State, Nigeria.*

Authors' contributions

This work was carried out in collaboration among all authors. Author NJC conceptualized the problem and developed the study template, author MA provided the protocol for the experiment, author RAA handled interpreted the results generated and author EO proof read the manuscript before submission and managed the literature searches. All authors read and approved the final manuscript.

Article Information

DOI: 10.9734/SAJRM/2021/v10i130222

Editor(s):

(1) Dr. Emin Umit Bagriacik, Gazi University, Turkey.

(2) Dr. Ana Claudia Coelho, University of Tras-os-Montes and Alto Douro, Portugal.

Reviewers:

(1) Joel Kipkorir Kirinyet, Moi University, Kenya.

(2) Hamid H. Hussien, King Abdulaziz University, Saudi Arabia.

Complete Peer review History: <https://www.sdiarticle4.com/review-history/68964>

Original Research Article

Received 05 April 2021

Accepted 11 June 2021

Published 16 July 2021

ABSTRACT

The aim of this study was to determine the prevalence of malaria parasite infection (MPI) among patients attending Primary Health Care clinic (PHC) at Garaku, Kokona Local Government Area of Nasarawa State North Central Nigeria. A formal consent was issued by the Nasarawa State Hospital management Board to conduct the study. A study population size of 150 consenting, apparently healthy, males and females who had attended the Primary Health Care clinic situated at Garaku, Kokona Local, Government of Nasarawa State, for medical treatment, were recruited for the study. The study took place between the month of May 2019 and September 2019. The socio-demographic features of each participant were verbally obtained, and included sex, age,

occupational and educational statuses. The gold standard tool (microscopy) was relied upon to determine the prevalence of malaria infection among the subjects. Blood samples collected from patients were Giemsa stained and microscopically examined for malaria parasites. Analysis of the samples revealed malaria prevalence of 53.3 %among the sampled population. Further analysis on malaria prevalence with respect to factors such as age, educational and occupational status revealed that malaria infection was more prevalent among the civil servants (75%), followed by the elderly (71.4%), and followed by the educated (73.3%) in the population. In conclusion, the study established that women, civil servants, the elderly, and the least educated were more vulnerable to malaria infection within the study location

Keywords: Malaria; clinic; prevalence; blood; population.

1. INTRODUCTION

Malaria is a mosquito-borne infectious disease that has ravaged mankind for decades. This deleterious disease is known to be caused by a protist of the genus plasmodium [1]. Research has identified the female *Anopheles funestus*, *Anopheles moucheti*, *Anopheles gambiae* and *Anopheles arabiensis* as vectors of this deadly parasite which initiates infection during their blood-sucking meal by depositing the sporozoites into the circulatory system and ultimately to the liver tissue of an infected host where they mature and reproduce [2]. Infection of human host with malaria parasites is associated with symptoms such as fever, headache, abdominal discomfort, headache, joint-ache, vomiting, lethargy and anorexia etc [3].

Being a serious public health problem, malaria impedes economic development, thereby causing poverty in endemic countries, particularly those within sub-Saharan Africa. The said disease is responsible for about 10% of Africa's overall disease burden, accounting for 40% of public health expenditure [4]. In Nigeria, for example, malaria is known to be the most severe public health problem imposing substantial socio-economic costs on both the citizens and the government to manage [5].

Nigeria as a country is divided into 36 states and the Federal Capital Territory (FCT). It is one of the sub-Saharan African countries where malaria infection is endemic. It is categorized as the most populated country in the African continent, with a total land area of 923,768 square kilometers [6]. Nasarawa state, where the study took place, is situated in the North Central Region of Nigeria. It lies between latitude 74.5° and 92.5°N of the Greenwich meridian and covers a land mass of 27,862km² [7].

Garaku is the headquarters of Kokona Local Government Area of Nasarawa State. It has a

land area coverage of 1,844km² and a population of 109, 746. Major economic activities within the Local Government seat of power are farming and trading [8].

2. METHODOLOGY

The study involved a total of 150 apparently healthy persons comprising male and female who relied on the Primary Health Care clinic (PHC) situated in Garaku, Nasarawa State for medical treatment from the month of May 2019 to September 2019.

2.1 Test Procedure

2.1.1 Microscopy method (Gold Standard) for examining malaria parasitaemia

To make a thin film, a drop of fresh blood was placed at the centre of a microscope glass slide. With the aid of the edge of a clean glass slide, the blood was spread to cover an area of about 10 mm² [9]. The slides were labeled with the numbers assigned to respective patients. The slides were then air-dried, after which they were fixed with absolute methanol, air-dried and stained with 5% Giemsa's solution for 20 minutes. After staining, the slides were rinsed with mild running tap water and were air-dried. In making thick films, a little drop of blood was introduced at the centre of the grease-free slide, then spread using the edge of another slide in repeated coil-shaped to defibrinate red blood cells at a diameter of approximately 2cm. The slides were labeled using diamond pencil and left horizontally to dry and were properly kept to protect them against dust, flies and damage prior to staining. After drying, the slides were subsequently stained with 5% Giemsa stain for 20 minutes and observed microscopically under X100 oil-immersion objective lens and results reported qualitatively [9].

2.2 Inclusion Criteria

The inclusion criteria for this study were on the basis of the clinician's request for blood slide examination test for malaria parasites from the Primary Health Care clinic attendees

2.3 Exclusion Criteria

Patients who had consumed anti-malaria therapy three weeks before visiting the care clinic were excluded to participate in this study.

3. RESULTS

Table 1. Prevalence of malaria parasites among patients attending PHC clinic Garaku

Gender	No. of patients examined	No. of positive cases	Prevalence (%)
Male	58	26	44.8
Female	92	54	58.6
Total	150	80	53.3

Table 2. Prevalence of Malaria infection among Patients at varying Age groups at PHC clinic Garaku

Age group	No. of patients examined	No. of positive cases	Prevalence (%)
0-10	30	20	66.6
11-20	15	9	60
21-30	26	13	50
31-40	29	10	34.4
41-50	20	11	55
51-60	15	7	46.6
61-70	8	5	62.5
71-80	7	5	71.4
Total	150	80	53.3

Table 3. Prevalence of malaria infection among patients of varying educational statuses PHC clinic at Garaku

Education level	No. of patients examined	No. of positive case	Prevalence (%)
Primary School	34	24	70.5
Secondary School	71	22	30.9
Tertiary School	45	33	73.3
Total	150	80	53.3

Table 4. Prevalence of Malaria among Patients of varying Occupational Status attending PHC Garaku

Occupation	No. of patients examined	No. of positive cases	Prevalence (%)
Students	60	37	61.6
Farmers	22	15	68.1
Civil servants	8	6	75
Unemployed	40	12	30
Self employed	20	10	50
Total	150	80	53.3

4. DISCUSSION

Malaria prevalence among patients attending Primary Health Care Clinic (PHC) GarukaNasarawa State was 53.3% following the examination of a population of 150 persons comprising of males (53.7%) and females (44.8%). Although this result was consistent with the work of [10] who had similarly established that malaria prevalence was higher among the females than the males residing in Aba and Umuahia urban area of Abia State, Nigeria. The higher prevalence of malaria as recorded for the females in this study may have occurred by chance as the variation in malaria prevalence among the males and the females could not be empirically traced to any reason owing to the fact that both genders may have been exposed to the bite of an infected vector. In fact, this was substantiated by the reports of Gilles and Warell, [11] which affirmed that there was no scientific evidence in existence that malaria infection was gender-based. Other possible reasons which could have caused this lopsidedness in the distribution of malaria in the study population may be attributed to lifestyle or certain cultural practices within the communities that exposes the females to more infection.

Prevalence of malaria among patients of varying age groups attending PHC, Garaku was highest among the elderly (71.4%). However, a higher malaria prevalence of (66.6%) and (62.5%) were recorded for the children aged 0-10 years and the middle aged respectively. This could be as a result of poor environmental sanitation. This outcome is in tandem with the work of Mac et al [12] which reported higher malaria prevalence for <20 children in Abuja and KeffiNasarawa metropolis of Nigeria.

With regards to varying educational status, the highest prevalence of malaria among patients attending PHC clinic, Garaku, was observed in the tertiary education category (73.3 %) and least prevalent in the secondary education category (30.9%). This may be as a result of increased awareness on the importance of environmental sanitation in clearing breeding sites of vectors, coupled with improved adherence to the use of insecticide treated nets (ITNs). This result is substantiated by the work of Tusting et al [13] which affirmed that education and access to fair income helps in preventing and controlling malaria infection was critical. [14]. With respect to varying occupational background, the prevalence of malaria among PHC Garaku

attendees, the study showed that the disease was more prevalent among civil servants (75%) followed by the farmers (68.1%). The socio-economic status may have accounted for the observed varied prevalence, but however, Onah and Omudu [15] contradicted the relationship between occupation and high prevalence of malaria among residents of Garaku.

5. CONCLUSION

Although this research has established that more women than men are suffer from malaria in the study location, no one factor could be held responsible for this observation. Therefore, stringent and holistic approach is critical in tackling the menace in Garaku Local Government Area of Nasarawa State.

CONSENT

As per international standard or university standard, patients' written consent has been collected and preserved by the author(s).

ETHICAL APPROVAL

As per international standard or university standard written ethical approval has been collected and preserved by the author(s).

COMPETING INTERESTS

Authors have declared that no competing interests exist.

REFERENCES

1. Ukaegbu CO, Nnachi AU, Mawak JD, Igwe CC. Incidence of Concurrent Malaria and Typhoid Fever Infections in Febrile Patients in Jos, Plateau State Nigeria. *International Journal of Scientific and Technology Research*.2014;3(4):157-161
2. WorldMalariaReport; 2011. Available:http://www.who.int/malaria/world_report_2011/9789241564403_eng.pdf.
3. WHOWorld Malaria Report. World Health Organization, Geneva, Switzerland; 2014.
4. WHO World Malaria Report. Geneva: World Health Organization; 2015.
5. Ughasoro MD, Okafor HU, and Okoli CC. Malaria diagnosis and treatment amongst health workers in University of Nigeria Teaching Hospital Enugu, Nigeria, *Nigerian Journal of Clinical Practice*. 2013; 16(3):329 –333.

6. Sabina K. Prevalence and Epidemiology of Malaria in Nigeria: A Review. *International Journal of Research in Pharmacy and Biosciences*. 2017; 4(8):10-12.
7. Yaro OO, Ebuga EA. An Assessment of the Development Potentials of Nasarawa State in Nigeria. *IOSR Journal of Environmental Science, Toxicology and Food Technology*. 2013; 6 (6):01-05.
8. Akwa VL, Binbol NL, Samala KL, Marcus ND. Geographical perspective of Nasarawa State. Onaiv printing and publishing company, keffi. 2000;3.
9. Cheesbrough M. *District Laboratory Practice in tropical countries*. 2nd Edn, University press Cambridge. 2000; 221-245.
10. Kalu MK, Nwogo AO, Florence O, Glory O. A Comparative Study of the Prevalence of the Malaria in Aba and Umuahia Areas of Abia State, Nigeria. *Journal of Parasitology*. 2012; 7(1):17-24.
11. Gilles AO, Warell CJ. Estimating the global clinical burden of *Plasmodium falciparum* malaria in 2007. *PLoS Medicine*. 1993;7(6):23-34.
12. Mac PA, Hussaini FA, Amuga G, Prerna T and Philomena A. Prevalence of *Plasmodium Falciparum* among Nigerians in Abuja and Central States: A Comparative Analysis of Sensitivity and Specificity Using Rapid Diagnostic Test and Microscopy as Tools in Management of Malaria. *International Journal of Tropical Diseases*. 2019;2(1):14-37.
13. Tusting LS, et al. Socioeconomic development as an intervention against malaria: a systematic review and meta-analysis. *Lancet*. 2013; 382:963–972.
14. Bleakley H. Disease and development: evidence from the American South. *Journal of European and Econ. Association*. 2003;1:376-386.
15. Onah IE, Omudu EA. Prevalence of malaria in relation to insecticide treated-nets usage in a rural and urban settlement in Benue State. *Nigerian Journal of Parasitology*. 2016; 37.

© 2021 Ndubuisi et al.; This is an Open Access article distributed under the terms of the Creative Commons Attribution License (<http://creativecommons.org/licenses/by/4.0>), which permits unrestricted use, distribution, and reproduction in any medium, provided the original work is properly cited.

Peer-review history:

The peer review history for this paper can be accessed here:
<https://www.sdiarticle4.com/review-history/68964>