GSC Advanced Research and Reviews

eISSN: 2582-4597 CODEN (USA): GARRC2

Cross Ref DOI: 10.30574/gscarr

Journal homepage: https://gsconlinepress.com/journals/gscarr/

(RESEARCH ARTICLE)

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Prevalence of malaria infection amongst students of a southwest Nigerian federal university

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GSC Advanced Research and Reviews, 2023, 15(01), 110–114

Publication history: Received on 02 January 2023; revised on 07 March 2023; accepted on 10 March 2023

Article DOI: https://doi.org/10.30574/gscarr.2023.15.1.0056

Abstract

One of the dreadful parasitic infection that ravages the lives of the very young and old in Sub-Saharan Africa is Malaria. It is a serious public health problem. Although interventions to curtail and curb it prevalence at various tiers of government local, state and federal were enforced, however, such strategy is not well disposed of in the citadel of learning –university amongst the students This form the basis of the objective of the study and why it is conducted.

Method: We examined the prevalence of malaria infection among students of the Federal university of Technology, Akure. Nigeria. Blood samples were collected from 300 patients between April 2019 to September 2019. Aged between 15 -30 years that visited the Medical centre with complaints and symptoms ranging from headache, body pains, undulating high temperature, nausea and vomiting abdominal cramps etc. Antimalarial drugs were not administered until outcome of laboratory result is available within a short while.

Result: A total number of three hundred (300) subjects were screened for malaria infection 183 (61%) were male while 117 (39%) were female. The number of individuals with malaria infection were 242 (80.6%) of the 300 subjects screened for malaria.

Conclusion: The prevalence rate of students infected with malaria parasitaemia is 80.6% of the student populace screened in the university under the study which indicated a high rate of prevalence of malaria. lt is therefore exigent to execute strategic interventions through health education in form of seminars/ workshop for the students and ways of prevention and elimination of the vector – anopheles mosquito in the environment.

Keywords: Prevalence; Malaria; Students; Infection

1. Introduction

Malaria is endemic in Sub-Saharan Africa where it accounted for high mortality and morbidity in tropical and subtropical regions of the world. Malaria is a serious public health problem caused by the *Plasmodium* parasite of the Apicomplexans family[1]. Malaria being a predominantly tropical disease, is one of the top three killers among communicable diseases in Africa [2].Malaria is one of the killer diseases worldwide. According to the World Health Organization (WHO) [3], 216 million new cases of malaria occurred globally. Besides most of the malaria cases were in the African region (90%) followed by the Southeast Asia region (7%) and eastern Meditteranean region (2%).The disease is transmitted from one person to another through the bite of female anophele mosquitoes [4]. It primarily infects people worldwide in tropical and subtropical areas mainly a Sub-Saharan Africa.[5]. Malaria is a parasitic infection caused by several Plasmodium species; *Plasmodium falciparum, Plasmodium vivax, Plasmodium malariae* and *Plasmodium ovale* are the four primary malaria parasites that caused infection in human whereas *Plasmodium knowlesi* is a zoonotic specie

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prevalent in Southeast Asia.[1].P.falciparum is the most pathogenic and together with *P. vivax* causes most death while *P. ovale* and *P.malariae* cause a milder form of malaria that is rarely lethal [6, 7]. The breeding of moisquitoes and the spread of malaria are aided by the environmental condition of tropical and sub- tropical African countries such as constant high temperature, humidity and copious stagnant water due to poor drainage system [8].These factors have been well reported in previous studies in Nigeria [9]; [10] Ethiopia [11] and Tanzania [12] regarding the prevalence of malaria infection. An estimated 3.2 billion individuals worldwide are at risk of acquiring malaria each year.[1]. Malaria caused the majority of worldwide morbidity and mortality, with nearly 3.1billion dollars spent on malaria control and elimination projects in Sub-Saharan Africa in 2017 [14]. Malaria significantly contributes to the rise in hospital visits throughout Nigeria's six geo – political zones [15]. A combination of interventions including insecticide spraying and insecticide treated bednets for mosquito control along with curative and preventive drug treatment are currently the main methods of malaria control.[25].

2. Material and methods

Study population; In this study a cross sectional design was conducted between April 2019 to September 2019. A total of 300 subjects comprising 183 male and 117 female students of the Federal university of Technology Akure. Nigeria. Aged 15 to 30years with complaints and symptoms ranging from headache, body pains, high temperature, nausea and vomiting, abdominal cramps etc that visited the university Medical Centre. No drug was administered until the outcome of laboratory result is available within a short while.

2.1. Sample collection and analysis

The presence of malaria *Plasmodium* was analyzed in a sample of 300 university students. Finger prick blood samples were collected using a careful aseptic procedure by swabbing the thumb finger with 70% alcohol and allowed to dry before pricking. Subsequent drops of blood were collected into grease free slide to make the thick films after which all slides were labelled accordingly. All samples collected were analyzed at the Medical laboratory department of the University Medical Centre.

The thick blood films were prepared in accordance with the World Health Organization- recommended technique [16].A drop of blood was smeared to a moderate thickness on a grease free slide, air dry then stained with 10% Giemsa stain . The blood was left for 10 minutes before washing away with distilled water. The slide was then placed vertically and was allowed to dry before being coated with oil immersion and examined at a magnification of 100 objective under the microscope. Positive results are indicated by the presence of ring forms of *Plasmodium* trophozoites.

3. Results

The result of the study showed that the prevalence of malaria infection among university students was 80.6% **.**Out of the 300 university students examined, 183 (61%) were male and 117 (39%) were female. As reflected in Table 1.The highest prevalence was observed among the male students 130 (53.7%) while the female had 112 (46.3%).Table 2 attests to this. In term of age 141(47%) were between the age group of 15 –20 years while 104 (34.7%) were between the age group. Next to this is age 21 –25 years which had 104 (34.7%) and 55 (18.3%) were between age group of 26 – 30 years. The severity of malaria infection in male subjects is indicated in Table 3 while Table 4 showed that of the female subjects.

Table I Age and sex distribution of the students analyzed

Age group in years	Male	Percentage	Female	Percentage
15 – 20	83	45.4	58	49.5
21 –25	68	37.1	36	30.8
26—30	32	17.5	23	19.7
Total	183	100	117	100

Table 2 The gender and number of students with malaria parasitaemia

Gender	Number of students	Percentage of Total
Male	130	53.7%
Female	112	46.3%
Total	242	100%

Table 3 The degree of parasitemia in Male students

Positive malaria	+	++	+++	Total
15 –20 years	10	48	6	64
21 – 25years	7	34	5	46
26 – 30 years	4	11	5	20
Total	21	93	16	130

Table 4 The degree of parasitemia in Female students

Positive malaria	+	++	+++	Total
15 –20 years	5	43	4	52
21 – 25 years	6	38	3	47
26 – 30 years	3	8	2	13
Total	14	89	9	112

Table 5 Total number of gender among the age -group

Age group	Male	Female	Total
15 –20 years	64	52	116
21 – 25years	46	47	93
26 –30 years	20	13	33
Total	130	112	242

4. Discussion

The result obtained in this study showed a high prevalence of malaria infection among students of the Federal university of Technology, Akure. The prevalence rate was 80.6% which indeed was significant. The findings was in consonance with an earlier report from the same institution by[17] slightly higher 84.2%.ln another report from other higher institution from Nigeria; Nnamdi Azikiwe university Akwa, according to [18] it was 80.3%. The high prevalence of malaria may be attributed to the presence of bushes and stagnant water around places of residence of the students. This can increase mosquito breeding in the environment and resulting in infection transfer to people living in such locations. Other activities engaged by students that predisposes them to infection is night reading in the class which expose them to moisquito bite.

Our study revealed that male subjects have a higher prevalence rate 130 (53.7%) than their female counterparts 112 (46.3%).Similarly, observed male prevalence in this study was also reported by [5] and [19] among Nnamdi Azikiwe

university students. However, the findings of this study contradict that of [20] who found female participants(31.2%) have a higher chance of contracting malaria than male subjects (27.7%).This can simply be explained by the fact that males exposed their bodies regularly sleeping outside which increase the risk of infection than female that are conservative , rarely exposed themselves nude in public but stay indoors, doing household chores limiting their exposure to malaria.One contributing factor that favours the male being more infected than female was their hormonal response. The production of oestrogen by female have been shown to augment anti –plasmodium immune response whereas testosterone suppresses anti –plasmodium immune response. [21]. The present findings showed that students aged 15 – 20 years have the highest prevalence Table5 attest to it followed by age 20 –25years and the least is aged 26 – 30years.This study agreed with the report of [22], [23] and [25], who found a higher frequency among the youngest age group(15 20 years) that the younger generation has a weakened immune system more prone to illnesses therefore the difference in parasite density found between age groups could be linked to an individuals level of immunity, which varies with age and lifestyle. The previous findings of [17] on the age group was not in agreement with this findings as the age group 20 -25years was the most prevalence in their report.

5. Conclusion

The study revealed high prevalence rate of malaria infection amongst the student of the university. How then do we reduce the menace of this dreadful disease that is endemic not only in Nigeria but in Sub –Saharan Africa and worldwide? The need for pragmatic approach by the management of the university to increase public awareness and enlighten seminars and workshop for the students, and also increase malarial prevention strategy and control with provision of insecticide treated nets will go a long way in eliminating the infection.

Compliance with ethical standards

Acknowledgments

l wishes to thank the member of staff of the Medical centre of the university and laboratory staff for their support and co-operation.

Disclosure of conflict of interest

The Authors declare that they have no competing interests.

Statement of ethical approval

The author does not involve in the use of animal/human blood in the course of this research study.

Statement of informed consent

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

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