Archives of Pulmonology and Respiratory Medicine

ISSN: 2639-362X

Volume 2, Issue 2, 2019, PP: 26-31

Relationship between Prevalence of Malaria Case and Malaria Risk Factors in Sokoto, North Western Nigeria

Ikpeama Osita John[1]*, Okafor Patrick Adimabua[2], Onuzulike Nonye Mariam[1], Ikpeama Chizoba Anthonia[3], Ikpeama Chinwe Joy[4], Igbineweka Osa Osazuwa[5], Ikpeama Emeka Andrew[6], Ofuenyi Jacob[7], Nwosu Nchedochukwu Paulastella[8], Ibeh Isaiah Nnanna[9], Gerald Chukwudi Mokwe[10], Ogwuegbu Juliet Uchechi[11], Franklin Otugeme[12], Mary Muazu[12], Ogbonna Charity Oluchukwu[13]

*[1]Department Of Public Health Imo State University,Owerri, Nigeria.

[2]School Of Medical Laboratory Sciences Ahmadu Bello University,Zaria, Kaduna State, Nigeria.

[3]Department Of Public Health Imo State University,Owerri[1] , Federal Medical Centre Kebbi State, Nigeria.

[4]Medicine San Frontires, Nigeria.

[5]Department Of Periodontology And Community Dentistry, University College Hospital, Ibadan, Nigeria.

[6]Anatomy Department Anambra State University Uli, Nigeria.

[7]Livon Medical Diagnostic Laboratory Service. No 1 Cold Room Street, Beside Maddala Hotel, Niger State, Nigeria.

[8]New Salvation Medical Centre, Sapele Delta State, Nigeria.

[9]Department Of Medical Laboratory Sciences, University Of Benin , Nigeria.

[10]Altinez Pharmaceutical Ltd 8 Obukun Street,Off Coker Road,Ilupeju, Lagos, Nigeria.

[11]Department Of Medicine, Imo State University, Owerri, Nigeria.

[12]1 Brigade Medical Centre, Nigeria Army Barrack Sokoto, Nigeria.

[13]College Of Health Sciences, Usmanudanfodiyo University Sokoto, Nigeria.

Ikpeama35@Gmail.Com

***Corresponding Author:** Ikpeama Osita John, Department of Public Health Imo State University, Owerri, Nigeria.*

Abstract

It is estimated that over 500 million people suffer from malaria infections annually, resulting in about 1-2 million deaths, of whom 90% are children in sub- Saharan Africa (Curing malaria together, 2008). Hence the research to determine the relationship between prevalence of malaria case and malaria risk factor in Sokoto, North Western Nigeria. A cross-sectional form of descriptive survey research design was used for this study. This is because descriptive studies are used when the characteristics of a population are either unknown or partially known (Hennekens and Buring, 2007) and because it examines the relationship between disease (or other health related state and other variable of interest as they exist (risk factors) as well as access the burden of malaria in this population of study. Structured interview guide was administered and Malaria was diagnosed microscopically by staining thick and thin blood films on a glass slide, to visualize malaria parasites.. The number of malaria cases in this seems to be increasing, due to increasing transmission risk in areas where malaria control has declined, the increasing prevalence of drug resistant strains of parasites, this study shows that between 0-17 year 48 tested positive (96%) with mean parasiteamia of 16000 parasite per µl blood, while between 18 and above years 21(70%) tested positive too malaria with mean parasiteamia of 3200parasite per µl blood. The malaria prevalence rate of 86.3%. The result from this study showed that poor behavior against malaria disease has promoted the increase of the disease in this area.

Keywords: *Malaria parasite, Parasiteamia, Behavior/risk factor, Prevalence rate, Malaria resistance, Nigeria*

Introduction

Malaria, sometimes called the "King of Diseases", is caused by protozoan parasites of the genus *Plasmodium*(Curing malaria together,2008). The most serious and sometimes fatal type of malaria is caused by *Plasmodium falciparum*. The other human malaria species, *P. vivax*, *P. ovale*, *P. malariae*, and sometimes *P. knowlesi* can cause acute, severe illness but mortality rates are low. Malaria is the most prevalent infectious disease in tropical and subtropical regions, and continues to be a major global health problem, with over 40% of the world's population exposed to varying degrees of malaria risk in some 100 countries. It is estimated that over 500 million people suffer from malaria infections annually, resulting in about 1-2 million deaths, of whom 90% are children in sub- Saharan Africa (Curing malaria together, 2008). The number of malaria cases worldwide seems to be increasing, due to increasing transmission risk in areas where malaria control has declined, the increasing prevalence of drugresistant strains of parasites, and in a relatively few cases, massive increases in international travel and migration (Pasvol,2005). The need for effective and practical diagnostics for global malaria control is increasing (WHO, 2006), since effective diagnosis reduces both complications and mortality from malaria. Differentiation of clinical diagnoses from other tropical infections, based on patients' signs and symptoms or physicians' findings, may be difficult. Therefore, confirmatory diagnoses using laboratory technologies are urgently needed. This review discusses on the currently available diagnostic methods for malaria in many settings, and assesses their feasibility in resource-rich and resource-poor settings.

Statement of Problem

The human and economic costs associated with declining quality of life, consultations, treatments, hospitalization and other events related to malaria are enormous and often lead to low productivity and lost incomes (Erhun, *et al* 2005). In sub-Saharan Africa, where 90% of the world's malaria occurs, about 500 million cases are recorded annually with hundreds of thousands of child deaths. In Nigeria, like in many west-African countries, malaria is a major cause of morbidity and mortality. It is estimated that over 50% of Nigerians suffer at least one bout of malaria every year. The problem of malaria among adolescents has largely been overshadowed by the huge burden of HIV/AIDS among this younger age group (Lallo et*al* 2006).

Aims and Objective

The aim and objectives of this study is to determine the relationship between prevalence of malaria case and malaria risk factor in Sokoto, North Western Nigeria.

Significance of the Study

Results of the study would reveal the relationship between prevalence of malaria case and malaria risk factor.Specifically, result of the study would be significant to adults (male /female), Public health officers, health counselors, health educators, curriculum planners, medical allied personnel and researchers in assessing the risk factors promotinng prevalence malaria disease and initiating preventive measures in among inhabitants would help prevention programs succeed in the populace in sokoto metropolis.

Research Questions

a. what is relationship between prevalence of malaria case and malaria risk factor.

a. What are therisk factors for malaria fever.

Hypotheses

b. There is no relationship between prevalence of malaria case and malaria risk factor.

b. There is no risk factors for malaria fever.

Material And Methods

Research Design

A cross-sectional form of descriptive survey research design was used for this study. This is because descriptive studies are used when the characteristics of a population are either unknown or partially known (Hennekens and Buring, 2007) and because it examines the relationship between disease (or other health related state and other variable of interest as they exist (risk factors) as well as access the burden of malaria in this population of study. Information obtained will aid in describing the population of study.

Area of the Study

Sokoto is one of the seven states that form the North West geopolitical zone of Nigeria. It is bordered to the north by the Republic of Niger, Zamfara State to the east, Kebbi state to the south and west. It is situated in the savannah on the temperature of 44 degree Celsius annually. The city of Sokoto is its capital. Sokoto state traces its origin to the Sokoto Caliphate founded in 1809 by ShehuUsmandanFodio, the leader of the jihadists who overthrew the Hausa state of Gobir, Kano, Katsina and Kanem-Bornu. The empire fell after the British conquest of 1903 and the death of Attahiru, the Sultan of Sokoto, and became part of the Northern Region in the three-region structure of 1954. In 1967, Nigeria, the military administration of General Yakubu Gowon merged Sokoto and Niger provinces to form the North Western state. In 1976, North Western State was spilt into Sokoto and Niger states by the military administration of General MurtalaMuhammed. SokotoState covers an area of 28,232.37 square kilometers. The state is located between latitudes 40 to 60 north and longitudes 110 to 130 east has a population of 3,702,676 (2006 census figures). It accounts for 2.3 percent of Nigeria's total population.

Ethical Approval

This research will get ethical clearance from the Ethical Committee of the 1Brigade medical centre, Ginginya barrack, Sokoto and seek permission for collection data .This study was conducted in accordance with the Declaration of Helsinki, and the protocol was approved by the ethical research committee of the 1Brigade medical centre, Ginginya barrack, Sokoto.

Sample Size

A total of 80 subject were recruited for this study, sixty from August to October 2018 and twenty from May to July 2018.

Sample Collection

The patient's finger was cleaned with 70% ethyl alcohol, allowed to dry and then the side of fingertip is picked with a sharp sterile lancet and two drops of blood are placed on a glass slide. The main instrument for data collection consisted of structured interview guide was administered. Section A, was made up of two questions on demographic data (sex and age). Section B, contained four (4) questions on knowledge of risk factors to malaria fever.

Microscopic Diagnosis Using Stained Thin and Thick Peripheral Blood Smears (PBS)

Malaria *Plasmodium* species was diagnosed using Giemsa-stained thick blood films and thin blood films, remains the gold standard for laboratory diagnosis (Bharti, et al 2007). The patient's finger was cleaned with 70% ethyl alcohol, allowed to dry and then the side of fingertip is picked with a sharp sterile lancet and two drops of blood are placed on a glass slide. To prepare a thick blood film, a blood spot was stirred in a circular motion with the corner of the slide, taking care not make the preparation too thick, and allowed to dry without fixative. After drying, the spot was stained with diluted Giemsa (1 : 20, vol/vol) for 20 min, and washed by placing the film in buffered water for 3 min. The slide is allowed to air-dry in a vertical position and examination using a light microscope. As they are unfixed, the red cells lyse when a water-based stain is applied. A thin blood film was prepared by immediately placing the smooth edge of a spreader slide in a drop of blood, adjusting the angle between slide and spreader to 45° and then smearing the blood with a swift and steady sweep along the surface. The film was then allowed to air-dry and is fixed with absolute methanol. After drying, the sample is stained with diluted Giemsa (1 : 20, vol/vol) for 20 min and washed by briefly dipping the slide in and out of a jar of buffered water (excessive washing will decolorize the film). The slide was then allowed to air-dry in a vertical position and examined under a light microscope (X100 objective) (Chotivanich and Silamut 2006).

Method of Data Analysis.

Data collected were analyzed using descriptive statistic of frequency count, normative percentage and grand mean; as well as inferential statistics of chi-square ($\chi 2$). The level of significant was fixed at 0.05. Appropriate degrees of freedom were worked out.

Data Presentation and Analysis

The chapter deals with data presentation, analysis and discussion of the results obtained based on the objectives, and the research questions of the study as well as the hypotheses. Research questions were answered using percentages (%), null hypotheses were tested using inferential statistics of chi-square. The level of significance was set at 0.05.

Table 1. *The distribution of test according to age group*

Age group (years)	Total tested	Tested positive	Mean quantitative (parasite per µl of blood)
0-17	50	48(96%)	16000
18 and above	30	21(70%)	3200
Total	80	69(86.3%)	19200

This shows that between 0-17 year 48 tested positive (96%) with mean parasiteamia of 16000 parasite per µl of blood, while between 18 and above years 21(70%) tested positive too malaria with mean parasiteamia of 3200parasite per µl of blood. The malaria prevalence rate of 86.3%.chi-square ($\chi 2$) 0.86 critical value of 3.841 this confirm that there no relationship between those who had test and those who tested positive. The level of significant was fixed at 0.05. degree of freedom 1.

Table 2. *The distribution of test based on time (August- October 2018 and May-July 2018)*

Time within the years	Total tested	Tested positive	Mean quantitative (parasite per µl of blood)
August- October 2018	60	58 (96.7%)	15200
May-July 2018	20	12 (60%)	1600
Total	80	70(86.3%)	16800

This show that between August- October 2018 out of 60 tested, 58(96.7%) tested positive to malaria with mean parasiteamia of 15200parasite per µl of blood, while between May –July 2018 tested only 12(60%) tested positive to malaria with mean parasiteamia of 1600 parasite per µl of blood, the chi-square ($\chi 2$) 1.356 critical value of 3.841 this confirm that there no relationship between those who had test and those who tested positive between between August- October 2018 and May –July 2018. The level of significant was fixed at 0.05. degrees of freedom 1

Table 3. *Frequency distribution of respondents Risk factors to malaria fever in Sokoto Metropolis.*

S/NO	Risk factors to malaria fever	High	Low	Total
1	Living/worked in mosquito breeding site in last one month.	73(91.3%)	7(8.7%)	80
2	febrile illnesses in the last one month	80(100%)	0(0%)	80
3	use mosquito bit protection measure	45(56.3%)	35(53.7%)	80
4	indiscriminate use of antimalarials	67(83.7%)	13(26.3%)	80

This show the behavior that promote the spread of malaria among the subject. Living/worked in mosquito breeding site in last one month was very high 73 (91.3%), febrile illnesses in the last one month was also very high 800(100%), the use mosquito bit protection measure was poor 45 (56.3%), the indiscriminate use of antimalarials was high 67 (83.7%).

Discussion

Clinical diagnosis malaria is based on the patients' signs and symptoms, and on physical findings at examination. The earliest symptoms of malaria are very nonspecific and variable, and include fever, headache, weakness, myalgia, chills, dizziness, abdominal pain, diarrhea, nausea, vomiting, anorexia, and pruritus (Looareesuwan, 1999). The case of malaria in this study between 0-17 year showed that 48 tested positive (96%) with mean parasiteamia of 16000 parasite per µl of blood, while between 18 and above years 21(70%) tested positive too malaria with mean parasiteamia of 3200 parasite per µl of blood. The level of immune strength is also a great factor in malaria case since children are prone to this attack due low immune strength than adult, this explain the high cases of malaria between the ages 0-17 years, some the patient were admitted for the treatment at the facility. The malaria prevalence rate of 86.3%.The 1998 Roll Back Malaria (RBM) initiative, launched in Geneva by the United Nations Children's Fund (UNICEF), the United Nations Development Programme (UNDP), the World Bank and the World Health Organization (WHO), is a people-oriented programme that

emphasises community participation. School children could contribute immensely to its success. Malaria-intervention goals in endemic areas should be to prevent mortality and reduce morbidity, as well as associated socio-economic losses. This requires the progressive creation of capacities for assessing the local malaria situation and selecting appropriate control measures.

Malaria disease is a periodic disease in this part of the world in the desert arid area not riverine. The cases of malaria between August- October 2018 out of 60 tested, 58(96.7%) tested positive to malaria with mean parasiteamia of 15200 parasite per µl of blood , this is because during this period there is a great harvesting process of farm produce and the use of protective measure was very poor at such more people will be infected with malaria fever, malaria relapse could also explain the case scenario since it is associated with plasmodium spp which common in Nigeria, while between May –July 20 tested only 12(60%) tested positive to malaria with mean parasiteamia of 1600 parasite per µl of blood. malaria case was a bit low which could be that since the climate is changing to raining season many have not had mosquito bite although as at late June rain has started which increases high by July. The incubation period of malaria fever also determine the timing of the fever since the fevers don't just start immediately it bite. The level of immune strength is also a great factor in malaria case since children are prone to this attack due low immune strength. A clinical diagnosis of malaria is still challenging because of the non-specific nature of the signs and symptoms, which overlap considerably with other common diseases, as well as potentially life-threatening diseases, e.g. common viral or bacterial infections, and other febrile illnesses. The overlapping of malaria symptoms with other tropical diseases impairs diagnostic specificity, which can promote the indiscriminate use of antimalarials and compromise the quality of care for patients with non-malarial fevers in endemic areas (Mwangi, etal 2005; Reyburn,etal 2004; McMorroweetal 2008).

The behavior/ risk factors that promote the spread of malaria among the subject. Living/worked in mosquito breeding site in last one month was very high 73(91.3%) a very direct high risk factor in promoting malaria disease confirming the high febrile illnesses in the last one month which was very high 80(100%), clinical diagnosis of malaria is still challenging because of the non-specific nature of the signs and symptoms, which overlap considerably with other common, as well as potentially life-threatening diseases, e.g. common viral or bacterial infections, and other febrile illnesses, the use mosquito bit protection measure was poor 45(56.3%), good attitude to reduce malaria disease is to put on mosquito bit protection measure since one live in mosquito infested area the poor attitude attribute significantly to the increase malaria prevalence promoting re-infection and creating treatment failure, the indiscriminate use of antimalarials was high 67(83.7%) which promote anti malaria drug resistance. The overlapping of malaria symptoms with other tropical diseases impairs diagnostic specificity, which can promote the indiscriminate use of antimalarials and compromise the quality of care for patients with non-malarial fevers in endemic areas (Mwangi, *etal*, 2005;Reyburn,*etal,* 2004; McMorrowe *etal,* 2008).Attitude and practice regarding a health problem can easily influence those of their peers, parents and other members of their communities. School adolescents, therefore, constitute a formidable community entry point for the control of malaria under the people-oriented malaria control strategy. Correct knowledge of a health problem, when combined with the right attitude, can lead to healthy behaviour and practice (McMorrowe *etal,* 2008).

Conclusion

The number of malaria cases worldwide seems to be increasing, due to increasing transmission risk in areas where malaria control has declined, the increasing prevalence of drug resistant strains of parasites, this study shows that between 0-17 year 48 tested positive (96%) with mean parasiteamia of 16000 parasite per µl of blood, while between 18 and above year 21(70%) tested positive too malaria with mean parasiteamia of 3200parasite per µl of blood. The malaria prevalence rate of 86.3%. The result from this study showed that poor behavior against malaria disease has promoted the increase of the disease in this area.

References

[1] Bharti AR, Patra KP, Chuquiyauri R, Kosek M, Gilman RH, Llanos-Cuentas A, Vinetz JM. Polymerase chain reaction detection of *Plasmodium vivax* and *Plasmodium falciparum* DNA from stored serum samples: implications for retrospective diagnosis of malaria. Am J Trop Med Hyg. 2007; 77: 444–446. [PubMed]

[2] Chotivanich K, Silamut K, Day NPJ. Laboratory diagnosis of malaria infection-a short review of methods. Aust J Med Sci. 2006;27:11–15.

[3] Curing malaria together. MMV website. [Accessed October 16, 2008]. Available at: http://www.mmv.org/.

[4] Erhun WO, Agbani EO, Adesanya SO. Malaria prevention: Knowledge, attitude and practice in a south-western Nigerian community. Afr J Biomed R. 2005; 8: 25–29.

[5] Lalloo DG, Olukoya P, Olliaro P. Malaria in adolescence: Burden of disease, consequences, and opportunities for intervention. Lancet Infect Dis. 2006; 6 (12): 780–793.

[6] Looareesuwan S. Malaria. In: Looareesuwan S, Wilairatana P, editors. Clinical Tropical Medicine. 1st ed. Bangkok, Thailand: Medical Media; 1999. pp. 5–10.

[7] McMorrow ML, Masanja MI, Abdulla SM, Kahigwa E, Kachur SP. Challenges in routine implementation and quality control of rapid diagnostic tests for malaria-Rufiji District, Tanzania. Am J Trop Med Hyg. 2008; 79: 385–390.

[8] Mwangi TW, Mohammed M, Dayo H, Snow RW, Marsh K. Clinical algorithms for malaria diagnosis lack utility among people of different age groups. Trop Med Int Health. 2005;10:530–536. [PMC free article] [PubMed]

[9] Pasvol G. Management of severe malaria: interventions and controversies. Infect Dis Clin North Am. 2005;19:211–240. [PubMed]

[10] Reyburn H, Mbatia R, Drakeley C, Carneiro I, Mwakasungula E, Mwerinde O, Saganda K, Shao J, Kitua A, Olomi R, Greenwood BM, Whitty CJ. Overdiagnosis of malaria in patients with severe febrile illness in Tanzania: a prospective study. BMJ. 2004; 329: 1212. [PMC free article] [PubMed]

[11] Warhurst DC, Williams JE. Laboratory diagnosis of malaria. J ClinPathol. 1996; 49: 533–538.

[12] World Health Organization. Guidelines for the treatment of malaria. 1st ed. Geneva, Switzerland: WHO; 2006. pp. 133–143.

Citation: **Ikpeama Osita John, Okafor Patrick Adimabua, Onuzulike Nonye Mariam, et al.** *Relationship between Prevalence of Malaria Case and Malaria Risk Factors in Sokoto, North Western Nigeria. Archives of Pulmonology and Respiratory Medicine. 2019; 2(2): 26-31.*