Prevalence of malaria among women attending a tertiary hospital in Sokoto metropolis, North-Western Nigeria

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ABSTRACT

Background: Nigeria currently has the second largest maternal mortality and highest transmission of malaria in the world. Approximately 9.2 million women and young girls who get pregnant annually in Nigeria are at risk of malaria in pregnancy (MIP). MIP is associated with adverse outcomes on both the mother and foetus.

Objective: To assess the prevalence of malaria among women attending a tertiary hospital within Sokoto metropolis.

Methods: The study was cross-sectional retrospective study. Records of women aged 15 years and above were extracted from the patient records (Jan – Dec, 2015) at Specialist Hospital Sokoto. Statistical analysis was performed using Chi-Squared test and risk ratio was calculated.

Result: A total of 71,384 women attended the hospital during the study period of which 10,408 were diagnosed to have malaria giving a prevalence of 14.6%. The prevalence was higher ($p<0.05$) among pregnant women, MIP (18.0%) than non-pregnant women, MIW (13.7%). The highest prevalence was recorded in the month of January (30.9%) while the lowest prevalence was seen in December with a prevalence of 8.2%.

Conclusion: The prevalence of malaria in the study population was 14% and pregnant women had a higher risk of malaria infection. A more robust prospective study is required to confirm the findings.

Key words: Maternal health, Malaria, Malaria in pregnancy, maternal death, prevalence, women.

Prévalence du paludisme chez les femmes fréquentant un hôpital tertiaire dans la métropole de Sokoto , nord-ouest du Nigéria

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RÉSUMÉ

Contexte: Le Nigéria occupe actuellement la deuxième position en mortalité maternelle et la première en transmission du paludisme au monde. Au Nigéria, environ 9,2 million de femmes et de jeunes filles enceintes chaque année risquent de contracter le paludisme pendant la grossesse (PPG). Le PPG est associée à des effets indésirables sur la mère et le fœtus.

Objectif: Evaluer la prévalence du paludisme chez les femmes fréquentant un hôpital tertiaire dans la métropole de Sokoto.

Méthodes: L'étude était une étude rétrospective transversale. Les dossiers des femmes âgées de 15 ans et plus ont été extraits des dossiers des patients (janvier - décembre 2015) à Specialist Hospital (hôpital spécialisé) Sokoto. L'analyse statistique a été effectuée en utilisant le test du chi carré et le rapport de risque a été calculé.

Résultat : un total de 71 384 femmes ont fréquenté l'hôpital pendant la période d'étude dont 10 408 cas de paludisme ont été diagnostiqués, soit une prévalence de 14,6%. La prévalence était plus élevée ($p<0,05$) chez les femmes enceintes, PPG (18,0%) que chez les femmes non enceintes, le paludisme chez les femmes (13,7%). La prévalence la plus élevée a été enregistrée au mois de janvier (30,9%) tandis que la prévalence la plus faible a été observée en décembre avec une prévalence de 8,2%.

Conclusion: La prévalence du paludisme dans la population étudiée était de 14% et les femmes enceintes avaient un risque plus élevé d'infection palustre. Une étude prospective plus robuste est nécessaire pour confirmer les résultats.

Mots-clés: Santé maternelle, Paludisme, Paludisme pendant la grossesse, décès maternel, prévalence, femmes.

INTRODUCTION

Nigeria joined the committee of nations to sign the United Nations Millennium Development Goals (MDGs) declaration in year 2000, with a commitment to reduce extreme poverty, improve access to quality healthcare, reduce maternal and child deaths, eradication or significant reduction in infectious diseases such as HIV/AIDS, malaria etc.[1] Over 15 years after this declaration, laudable maternal health metrics seem to be elusive to Nigeria.[2] Nigeria currently has the second highest maternal mortality in the world. In Nigeria, a woman's chance of dying from pregnancy or complications due to child birth is 1 in 13, compared to 1 in 31 for sub-Saharan Africa as a whole.[3, 4] Some of the most vulnerable maternal populations in the country include the poor, uneducated, adolescents, multiparous women, women in rural areas or Northern Nigeria.[3]

Malaria is still a major health problem in Nigeria and it accounts for the majority of hospital visitations and admissions in all age groups including pregnant women.[5] There are over 140 million people at risk of malaria every year in Nigeria and about 50% of the adult population experience more than one bout of malaria in a year.[5] Nigeria currently has the highest infection and transmission rates of malaria in the world and accounted for about 29% of all reported cases in 2013.[6] Malaria in pregnancy (MIP), peripheral or placental infection by *Plasmodium,*[7, 9] is a major public health issue because of it adverse outcomes on mother and foetus. Pregnant women in low to high transmission areas of malaria are increasingly susceptible to MIP. MIP may sometimes remain asymptomatic; however it can greatly increase the risk of maternal anaemia, low birth weight, miscarriage, stillbirth and infant mortality.[7-10] The disease is responsible for 11% of maternal mortality in the country, 30% of childhood deaths and still poses a significant health threat to all age groups.[5, 11] Therefore, the World Health Organization (WHO) recommends administration of at least two doses of sulfadoxine-pyrimethamine (SP) as intermittent preventive treatment (IPTp) to pregnant women leaving in malaria endemic areas during their antenatal clinic (ANC) visits.[11-13]

Malaria is holoendemic in Nigeria.[14, 15] Although several studies on malaria prevalence has been carried- out,[16-23] these studies are usually state or region specific and cannot adequately represent the prevalence of the disease nationwide because of social - cultural peculiarities of the various ethnic groups, environmental and other climatic conditions which varies widely across the country.[19] Various prevalence values have been reported for MIP across the country. For instance, in a cross-sectional study of 659 pregnant women at a secondary health facility in Abuja, North-Central of Nigeria, the prevalence of MIP was found to be 38.8%.[18] In addition, prevalence of 7.7%[20] and 4.8%[21] were reported in Lagos, South-West and Sokoto, North-West, Nigeria, respectively. In a control study conducted in Midwestern Nigeria in 2009, results showed a significant reduction in both peripheral and placental parasitaemia in group of women who took two or three doses of IPTp-SP (16.2%) versus the group who didn't receive any treatment (23.7%).[23] There was also a significant reduction in the adverse event associated with MIP such as anaemia, risks of abortion, preterm delivery, and low birth weight in the treated group vs the untreated group.[23]

The prevalence of MIP is influenced by several factors such as transmission intensity, pre-immunity, parity of the mother and use of protective measures such as insecticide-treated nets (ITNs) and IPTp.[22, 24-26] Women in their first and second pregnancies are usually more prone to malaria.[10, 27-28] It is estimated that approximately 50 million women living in malaria endemic areas become pregnant annually[8] indicating that large number of women are at risk of the infection yearly.

The gains made towards malaria control are once again being threatened following the reports of emergence of resistance to artemisinin-based combination therapies (ACTs) in Southeast Asia.[6, 29, 30]. In addition, there are emerging reports of reduced IPTp efficacy due SP resistance.[31, 32] The development of SP resistance will undoubtedly have an untoward influence on the malaria burden. For instance, in East Africa resistance to IPTp has been associated with an increased risk of foetal anaemia and severe malaria in the infants.[32] With the reports of rising resistance to SP, it is important to monitor the prevalence of the MIP, an important determinant of maternal health indices. Hence this study was design to ascertain the prevalence of malaria among women attending the outpatient clinics of the Specialist Hospital Sokoto, from January to December 2015.

METHOD

Study location

The study was conducted at Specialist Hospital Sokoto a tertiary healthcare facility in the Metropolitan city of Sokoto, Sokoto State. Specialist Hospital has one of the highest patient attendances in the State because of the cost of Medicare is highly subsidized by the State Government. Sokoto State is located in the extreme Northwest of Nigeria, with an annual average temperature of 28.3^{0}C. For most of the year, Sokoto is very hot and can also have extreme cold temperatures during the cold season.[33] There are two major seasons, wet (June-September) and dry (October-May). The two seasons are distinct and are characterized by high and low malarial transmission respectively.[34] The population of Sokoto metropolis is about 581,300[35] and approximately 147,046 are women between the ages 15-64 years.[35] Malaria is hyperendemic with seasonal variations. Like most parts of Nigeria, *P. falciparum* is the dominant *Plasmodium* species in the state.[35]

Study design and data collection

This study was a cross-sectional retrospective study using records (sex, age, pregnancy status, diagnosis etc.) of patients seen at Outpatient Department and Ante-natal Clinics from January to December 2015. The inclusion criteria included women who were 15 years and above, attending either the Female Outpatient or Ante Natal clinics within the study period and having relevant bio data. The data were verified and duly signed by both the Data Officer Hospital Activities Analysis Unit and the Head, Medical Records department.

Ethical approval for the study was obtained from Ethical Review Committee of the Specialist Hospital Sokoto.

Statistical analysis

The means and percentages were calculated using GraphPad Prism version 6.00 for Windows (GraphPad Software, La Jolla California USA), Chi-Square tests and relative risks were performed using IBM© SPSS© Statistics v20.0. International Business Machine Corp. The significance level was set at $p < 0.05$.

RESULTS

A total of 71,384 women attended the out patients clinics during the study period. Among these 15,095 were pregnant and attending the ANC clinic, while 56,289 were not pregnant. A total of 10,408 were diagnosed to have malaria giving a prevalence of 14.6%. The prevalence was higher ($p<0.05$) among pregnant women, MIP (18.0%, 2719/15095) than non-pregnant women, MIW (13.7%, 7689/56289). In both groups, a higher number of cases were seen in women aged 15-45 years compared to 46 years & above (73.2% vs 26.8% for MIW, $p<0.05$; 75.6% vs 24.4% for MIP, $p<0.05$). The highest prevalence was recorded in the month of January (30.9%) while the lowest prevalence was seen in December with a prevalence of 8.2% ($p<0.05$) [Table 1]. The age-group distribution of MIP and MIW is shown in Figure 1.

Table 1: Monthly-distribution of Prevalence of Malaria among Women Attending the Out-Patient Clinics of Specialist Hospital Sokoto between January and December, 2015

Month	Number of Patients	Patients with Malaria	Prevalence (%)
January	1061	328	30.9
February	2766	752	27.2
March	4454	868	19.5
April	5450	838	15.4
May	4889	853	17.4
June	3615	647	17.9
July	4984	689	13.8
August	7900	1109	14.0
September	7437	1042	14.0
October	8468	1256	14.8
November	7207	954	13.2
December	13153	1072	8.2

The average monthly malaria positive cases were 867 ± 71.5 (SEM). Table 2 presents the relative risk and prevalence of malaria among the women. The prevalence was higher among pregnant women ($p<0.05$) and aged 15-45 years ($p = 0.021$).

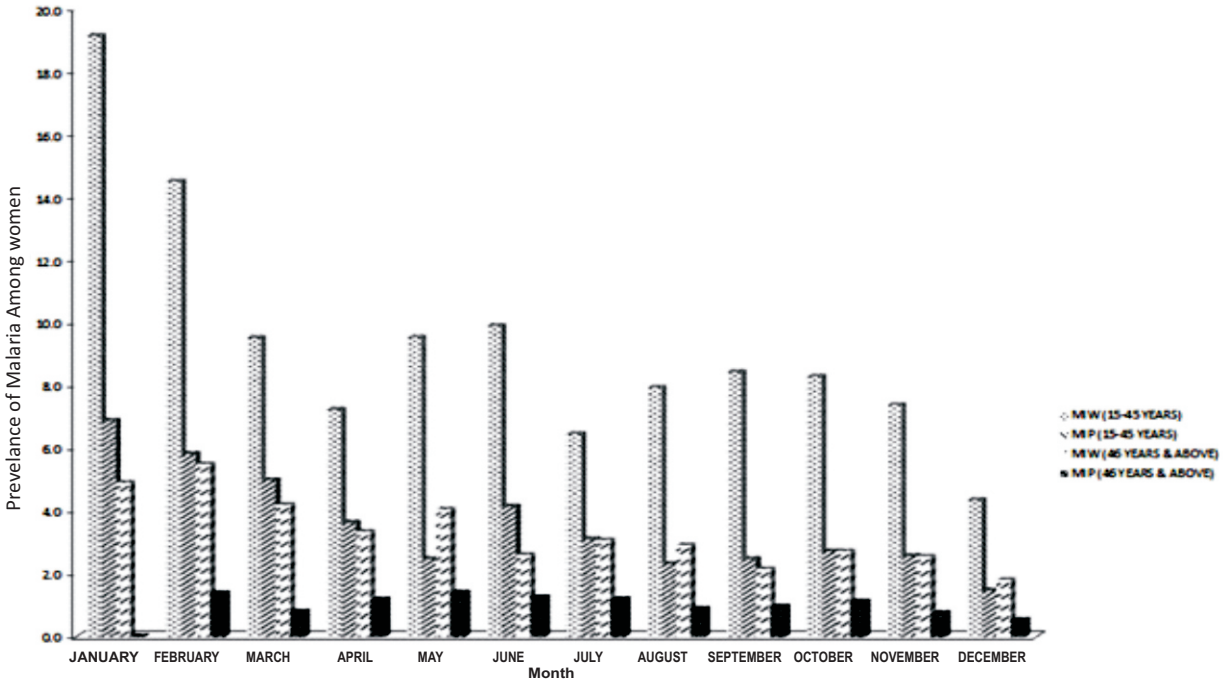

Fig. 1: Prevalence Malaria in Women Based on Age and Pregnancy Status

(MIW – malaria in women not pregnant; MIP – Malaria in Pregnancy)

Table 2 Relative risks of malaria in pregnant women and women between 15-45 years.

Variable	Total Number of Women	Number with Malaria (%)	Relative Risks (95% CI)
Pregnancy Status			
Yes	15,095	2,719[α] (18.0)	1.319 (1.267 - 1.372)
No	56,289	7,689 (13.7)	0.950 (0.942 - 0.957)
Age (years)			
15 – 45	52,039	7684[β] (14.8)	1.049 (1.007 - 1.092)
46 - Above	19,345	2,724 (14.1)	0.992 (0.985 - 0.999)

[α]statistically significant using *Pearson Chi - Square* ($p < 0.05$)
[β]statistically significant using *Pearson Chi - Square* ($p = 0.021$)

DISCUSSION

Malaria is still a major health concern in Nigeria and it is also a major influencer of the maternal health in the country. Malaria in pregnancy contributes significantly to the maternal health metrics in terms of morbidity and mortality. An average of 867 women was diagnosed with malaria every month in this study and was higher than enrolments in other studies within the country and the study duration was longer.[20, 36] The prevalence of malaria among the patience attending the hospital was 14.6% and is within the range of earlier reported figures,[21, 23] but much lower than the 38% reported by Ogbu *et al.*[18] This study showed that malaria is still the major reason for hospital visitations within the country. The highest prevalence was seen in the month of January. This is a deviation from the norm, because the highest prevalence for malaria is usually reported during the malaria transmission season of August to December. A study done within the same period however did not report month specific prevalence[17] and therefore direct comparison could not be made. The prevalence MIP were seen more in women aged 15 – 45 years, and this is line with previous reported findings.[10, 20-23, 28]

The prevalence of malaria among pregnant women attending the ANC clinic for the study period was 18.0%. This figure is lower than the 59.9% reported by Nwagba and colleagues for Enugu within a study period of 18 months[17] and the 38.8% prevalence reported for a tertiary hospital in Abuja Nigeria.[18] A two-month study conducted by Isah and colleagues amongst pregnant women attending ANC in Usmanu Danfodiyo Teaching hospital (UDUTH) in Sokoto reported MIP prevalence of 3.1% using direct microscopy and 4.8% with the Rapid Diagnostic Test.[21] The reason for the observed difference could have been due to difference in infection pattern of malaria in study areas, study duration and possibly use of other malaria preventive measure. However, the lack of well-coordinated and consistent studies on MIP within the country makes it very difficult ascertain the actual prevalence of MIP in Nigeria.

The recent reports of emerging resistance to SP,[31, 38-40] which is the only chemoprophylaxis agent used presently as IPTp in pregnant women is a major source of concern, considering that the country has the highest infective and transmission rates of malaria in the world.[5, 6, 12] A large population of women and young girls are still exposed to malaria, which further increases MIP associated adverse events to the foetus, neonates' susceptibility to congenital malaria and also portends a serious health risk to mothers and infants.

For Sustainable Development Goals to be achieved in Nigeria by 2030, there must be deliberate and positive changes in the area of data generation, collection and monitoring of important health indices such as malaria, maternal health, infant and maternal mortality. Such data must also be evidence based and readily verifiable, as this is the only way the health system management can be effective.[2, 3] This study, although preliminary in nature, showcased the prevalence of malaria among women in Sokoto metropolis.

A major drawback of this study was that, the method for malaria diagnosis was not clearly stated and most of the diagnoses for malaria were based on clinical presentations, this would have led to misdiagnosis and overtreatment. Therefore efforts should be made to increase and improve diagnosis using parasitological screening. Earlier study in Sokoto in another tertiary facility reported 62.2% based on clinical symptomatology and 37.8% laboratory confirmed diagnosis.[37] Other limitations of this study include the gestational age and gravidity of malaria infected pregnant women were not recorded, and whether or not the women were given the IPTp – SP as at when due were not properly documented. This will have assisted to better classify the MIP seen among the women, because multigravidas (women who have been pregnant two or more times) usually have a form of protective immunity when compared to primigravidas (women with their first pregnancy).[7-9, 23] There was also no record of the number of women who had access to other preventive measures such as the use of insecticide treated nets. Pregnant women who sleep under ITNs or use other malaria preventive methods have been known to have lower incidence of malaria.[13, 23]

CONCLUSION

Malaria was identified as an important reason for hospital visitations among women in Sokoto metropolis. The risk of having malaria was higher in pregnant women compared to those who were not and more cases were seen in women aged 15 – 45 years which is consistent with previous reported studies. A more robust study is required within this vicinity in order to identify the probable causative factors and possible ways to ameliorate the situation and improve the maternal health indices of women in the state.

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