

## Care providers' knowledge and practice of malaria control measures in pregnancy in Ibadan, South-West Nigeria

A Oladokun<sup>1</sup>, OA Adesina<sup>1</sup> and RE Oladokun<sup>2</sup>

Departments of Obstetrics and Gynaecology<sup>1</sup> and Paediatrics<sup>2</sup>,  
College of Medicine, University of Ibadan, Ibadan, Nigeria

### Abstract

**Background:** Effective prevention and control of malaria during pregnancy include prompt and effective case management of malaria combined with prevention of infection by the use of insecticide-treated nets and intermittent preventive treatment in pregnancy (IPTp). Care givers knowledge and practice of malaria control is pivotal to effective implementation of these guidelines. The objective of this study was to determine the awareness of care providers in facilities offering maternity services in Ibadan of the National Malaria Treatment Guideline and Policy in Nigeria. The study also aimed to describe the prescription practice, for malaria chemoprophylaxis and case management in pregnancy, by these care providers.

**Materials and method:** The study was a cross-sectional survey of the lead care givers in all registered hospitals and maternity centres in Ibadan over one year (April 2008 to April 2009), using structured questionnaires. The list of the one hundred and thirty-two (132) registered centres was obtained from the State Ministry of Health. The lead care givers provided information on their awareness of the new government policy and antimalarials believed to be effective and prescribed for malaria prevention and case management in pregnancy.

**Results:** Over two thirds (84.2%) of the facilities were operated by either Medical Officers with only basic medical training or by Nurses/ Midwives. The modes of prevention most commonly reported as being effective were the use of insecticide spray, window nets and ITN. The drugs most commonly prescribed for chemoprophylaxis were sulphadoxine-pyrimethamine (SP) (65.2%), Proguanil (45.5%) and pyrimethamine (42.4%). The drugs most commonly prescribed for case management were ACTs (66.7%), amodiaquine (59.8%) and artemether (47.7%). Quite a number of respondents were unsure of the frequency (81.8%) and timing (56.5%) of administration of sulphadoxine-pyrimethamine for prophylaxis.

**Conclusion:** This study demonstrates awareness but lack of in-depth knowledge of control measures. Also, there is poor use of the recommended agent for IPT. The factors militating against the use of these preventive measures need to be urgently explored and addressed.

**Key words:-** Malaria in pregnancy, chemoprophylaxis, intermittent preventive therapy

Correspondence: Dr. A. Oladokun, Department of Obstetrics and Gynaecology, College of Medicine, University of Ibadan, Ibadan, Nigeria. E-mail: sinaoladokun@yahoo.com; oladokun@comui.edu.ng

### Résumé

Le contrôle et la prévention effective du paludisme pendant la grossesse inclut les soins précis et efficaces combiné avec la prévention de l'infection par l'usage des moustiquaires imprégnés et le traitement préventif intermittent en grossesse (TPI). La connaissance et la pratique des personnels de santé est important dans l'implémentation effective des instructions. L'objectif de cette étude était de déterminer le sensibilisation des personnels de santé enregistrés dans les centres de santé offrant les soins de maternité à Ibadan du Programme de traitement, guide et politique nationale sur le paludisme d'Avril 2008 à Avril 2009 en utilisant un questionnaire structuré. L'étude aussi avait pour but de décrire les pratiques de chimioprophaxie et des soins en grossesse by les personnels de santé. Au total cent trente deux (132) centres enregistrés par le ministère de santé de cet état. Les personnels de santé apportaient des informations de senbilisation sur la nouvelle politique gouvernementale et les médicaments antipalustres pourraient être effectifs et prescrit dans la prévention et les soins du paludisme. Plus de deux tiers (84.2%) des facilités étaient opérés par les médecins avec juste une formation médicale généraliste ou par une infirmière ou sage femme. Les modes de prévention les plus communément rapportées étant efficace étaient l'usage des insecticides, moustiquaires de fenêtres et moustiquaires imprégnés. Les médicaments les plus communément prescrit pour chimioprophylaxie étaient la sulfadoxine-pyriméthamine (SP) (65.2%), Proguanil (45.5%) et pyriméthamine (42.4%). Les médicaments couramment prescrit dans les soins étaient les CTAs (66.7%), amodiaquine (59.8%) et Artemether (47.7%). Quelques participants n'étaient pas sûr de la fréquence (81.8%) et de planification (56.5%) d'administration de la sulfadoxine-pyriméthamine pour prophylaxie. Cette étude démontre une sensibilisation mais un manque de connaissances approfondies sur les mesures de contrôle. Aussi, Il y avait un faible usage des mesures préventives recommandées. Les facteurs influençant l'usage de ces mesures nécessitent d'être des recherches.

### Introduction

Prevention of malaria in pregnancy is a major public health challenge and a priority for the Roll Back Malaria (RBM) Partnership [1]. It is a condition that affects approximately 25 million women who conceive annually in malarious areas of sub-Saharan Africa (SSA) [2]. While every pregnant woman runs a higher

risk of contacting malaria than her non-pregnant counterpart [3], the harmful impact of malaria is most apparent in the first and second pregnancies [4]. It is associated with unfavourable pregnancy outcomes both in the mother and in her baby. These adverse pregnancy outcomes are a result of invasion of the placenta by parasites, inflammatory cells and cytokines [5] and they include: abortion, premature labour, low birth weight babies and foetal/maternal death in some instances [2, 6]. In high transmission areas, such as Nigeria, the RBM partnership recommends a three pronged approach for reducing the burden of malaria among pregnant women [7, 8]. These are effective case management of malaria infection, use of insecticide treated nets (ITN) and intermittent preventive treatment (IPTp).

IPTp with therapeutic doses of sulphadoxine-pyrimethamine (SP) has been shown by several workers from various malarious regions of SSA to be effective in reducing the prevalence of maternal and placental malaria parasitaemia among parturient women [5, 9-12]. The use of IPTp-SP has been shown to be associated with marked reduction in the incidence of clinically diagnosed malaria in the two weeks preceding delivery compared to mothers who used pyrimethamine or no chemoprophylaxis [5].

In addition, it is clearly superior to the previously widely prescribed pyrimethamine in protecting pregnant women from peripheral and placental parasitaemia, maternal anaemia and their neonates from Low Birth Weight (LBW) [5]. Indeed, the World Health Organization (WHO) expects 80% of all pregnant women living in areas of high transmission to receive IPTp-SP during pregnancy by 2010 [7]. ITNs have been demonstrated to result in significantly fewer preterm deliveries and babies with higher mean birth weight than women who did not use them [13-15]. Other protective measures include protective clothing, insect repellents, plain bed nets at household level and large-scale spraying of insecticides and environmental management at the community level [13].

In line with these observations, since 2005, the National Malaria Treatment Guideline and Policy in Nigeria recommends ITNs for all pregnant women, SP as first line agent for IPTp and quinine for treatment of clinical malaria in all trimesters [8]. Artemisinin based combination therapy (ACT) is considered safe second line agents in the second and third trimesters and may be used in first trimester where there are no suitable alternatives [1, 8]. However, despite evidence demonstrating the effectiveness of these interventions, the use of ITNs and IPTp-SP has been reported to be low [1, 5, 13, 15, 16]. In Nigeria, 60% of pregnant women will attend Ante Natal Clinic (ANC) at least once in the

course of their pregnancy. ANC may thus serve as entry points from which women can access information on effective prevention/ management options of malaria in pregnancy. However, this will only be possible if the care providers provide accurate information. The objective of this study was thus to determine the awareness of care providers in facilities offering maternity services in Ibadan of the National Malaria Treatment Guideline and Policy in Nigeria. In addition, the study also aimed to describe the prescription practice, for malaria prevention and case management in pregnancy, by these care providers.

### Materials and methods

The study was a cross-sectional survey of the lead care givers in one hundred and thirty-two (132) hospitals and maternity centres in Ibadan metropolis over a period of one year from April 2008 to April 2009. A list of the registered government and private hospitals within Ibadan metropolis was obtained from the State Ministry of Health which contained the 132 hospitals and maternity centres. All the hospitals and maternity centres were sampled. The lead care giver in each facility was identified during visits and interviewed.

Information obtained on the knowledge and utilization of malaria control and treatment measures by the care givers in pregnancy after obtaining their consent was entered into Microsoft Excel File and analysis done using SPSS 16 software package. Results are presented as frequency tables. Ethical approval for the study was obtained from the University of Ibadan/ University College Hospital (UI/UCH) Health Research Ethics Committee (UI/IRC/07/0111)

### Results

#### *Sociodemographic characteristics*

During study period, 132 selected registered health facilities within the Ibadan metropolis were surveyed. The mean age of the respondents was  $34.5 \pm 18.8$  years (range 19- 58 years). Almost two thirds of the respondents were women. Most of the respondents were Christians (88.6%) or Yoruba (83.3%). Over two thirds of the facilities were operated by either medical officer with only their basic medical training or by nurses/ midwives [Table 1]. The respondents had been practicing for a mean length of 2.62 years  $\pm$  1.31. The median number of women seen or delivered was reported as 6 and 3 respectively weekly.

#### *Awareness of modes of protection in pregnancy*

Most of the respondents reported awareness of the burden of disease and its contribution to adverse pregnancy outcomes. [Table 2].

**Table 1: Socio-demographic characteristics of lead health care provider**

	(N= 132) Percentage
<i>Sex</i>	
Male	35.6
Female	64.4
<i>Religion</i>	
Christianity	88.6
Islam	10.6
Others	0.8
<i>Tribes</i>	
Yoruba	84.0
Igbo	8.4
Hausa	0.8
Others	6.9
<i>Clinical work status of lead care giver</i>	
Specialists	7.1
Medical officers	54.0
Nurse/ midwives	30.2
CHEWS	1.6
Others	7.1

CHEWS- community health extension workers

The modes of prevention most commonly reported as being effective for vector control included window nets and ITNs. While most respondents were aware of the concept of drug resistant parasites, about one-third reported not being aware of a new government policy on the control of malaria in pregnancy. [Table 3]

#### Care provider knowledge and prescription of antimalarials for prevention and treatment

The drugs most commonly reported as being effective for prophylaxis were SP, pyrimethamine and Proguanil. The drugs most commonly reported as being effective for treatment were amodiaquine, ACT and artemether [Table 4].

The prescription pattern for chemoprophylaxis and treatment reflected the pattern of drugs believed to be effective for these uses. The drug most commonly prescribed for chemoprophylaxis was SP. However, chloroquine (CQ) and pyrimethamine were still being prescribed for chemoprophylaxis by some care providers. For case management, while most care providers mostly prescribed ACTs, there were still some prescriptions for CQ, artemether and SP. [Table

**Table 2: Knowledge of burden of malaria disease**

Adverse pregnancy outcome	Yes, N (%)	No N (%)	Don't know N (%)
A common condition in pregnancy	124(93.9)	5(3.8)	3(2.3)
May cause miscarriages	128(97.0)	3(2.3)	1(0.8)
Cause complications in the first trimester	127(96.2)	3(2.3)	2(1.6)
Cause complications in the second trimester	120(90.9)	7(5.3)	5(3.9)
Cause complications in the third trimester	113(85.6)	9(6.8)	10(7.6)
May cause stillbirths	113(85.6)	7(5.3)	12(9.0)
May cause maternal deaths	119(90.2)	10(7.6)	3(2.3)

**Table 3: Care- provider awareness of modes of protection in pregnancy**

Effective mode of vector control	Yes, N (%)	No N (%)	Don't know N (%)
Use of insecticide spray	77(58.3)	37(28.1)	18(13.6)
Mosquito coil	42(31.8)	70(53.0)	20(15.2)
Repellant cream	55(41.7)	50(37.9)	27(20.4)
Herbal preparation	4(3.0)	85(64.4)	43(32.6)
Window nets	100(75.8)	26(19.7)	6(4.5)
ITN	114(86.4)	9(6.8)	9(6.8)
Aware of drug- resistant parasites	109(82.6)	6(4.5)	17(12.9)
Aware of new govt policy on Control of malaria in pregnancy	84(63.7)	30(22.7)	18(13.6)

ITN- insecticide treated nets

**Table 4:** Care provider knowledge of effective anti-malarial for prevention and prescription pattern

	Effective for prevention N (%)	Prescription for prevention N (%)
Chloroquine	42 (31.8)	30 (22.7)
Amodiaquine	36 (27.3)	32 (24.2)
Halofantirine	9 (6.8)	4 (3.0)
ACT	23 (17.4)	18 (13.6)
Artemether	28 (21.2)	21 (15.9)
Pyrimethamine	86 (65.2)	56 (42.4)
Proguanil	86 (65.2)	60 (45.5)
SP	95 (72.0)	86 (65.2)
Quinine	17 (12.9)	12 (9.1)

\*Multiple responses; ACT- artemisinin based combination therapy; SP-Sulphadoxine pyrimethamine

**Table 5:** Care provider knowledge of effective anti-malarial for treatment and prescription pattern

	Effective for treatment N (%)	Prescription for treatment N (%)
Chloroquine	62 (47.0)	50 (37.9)
Amodiaquine	93 (70.5)	79 (59.8)
Halofantirine	31(23.5)	17(12.9)
ACT	90 (68.2)	88 (66.7)
Artemether	80 (60.6)	63 (47.7)
Pyrimethamine	16 (12.1)	25 (18.9)
Proguanil	18 (13.6)	15 (11.4)
SP	56 (42.4)	62 (47.0)
Quinine	52 (39.4)	36 (27.3)

\*Multiple responses; ACT- artemisinin based combination therapy; SP-Sulphadoxine pyrimethamine

**Table 6:** Care- provider knowledge of IPT admin

Frequency of administration	Percentage (N= 132)
Weekly	6.1
Monthly	12.1
Not sure	81.8
<b>Timing of administration</b>	
1st trimester	3.8
2nd trimester	37.9
3rd trimester	1.8
Don't know	56.5
<b>Dosing</b>	
3 tabs once in preg	6.8
3 tabs twice in preg at least 1 month apart	41.7
3 tabs thrice in preg at least 1 month apart	11.4
Not sure	40.1
<b>Counsel on use of ITN</b>	
Yes	78.8
No	21.2

ITN- insecticide treated nets

\*Correct frequency of administration 2 doses of 3 tabs one month apart in the 2nd trimester

5]. Quite a number of respondents however were unsure of the details of IPT- SP administration including the frequency and timing of administration [Table 6].

### Discussions

Despite the earlier reported compromised efficacy of pyrimethamine in malaria chemoprophylaxis, [11], some care providers were still prescribing this drug several years after a change in the Nigeria Malaria Control Program Policy. Other workers working in Ibadan further confirmed this by demonstrating significant differences between IPT-SP and pyrimethamine users in terms of the prevalence of parasitaemia, episodes of febrile morbidity and in neonatal LBW [5]. This non use of IPTp may not be peculiar to the city of Ibadan as several workers in various regions of Nigeria have reported low knowledge of malaria in pregnancy and management practice as well as poor maternal health care [17, 18]. Indeed, it has been suggested that this prescription patterns may be a proxy to the practice of IPTp by care providers in other parts of the country [1]. Although, not explored in this study, the poor utilization of SP has been attributed to health care providers' fear of side effects of SP and their inadequate knowledge of the correct dose. Indeed, some workers were unsure of dosing frequency and scheduling.

In case management of malaria, some practitioners were still prescribing CO. Again this is in spite of the fact that resistance to chloroquine is also well established in the study area and many parts of sub-Saharan Africa [2, 5, 19]. In addition, monotherapy of ACT was being done, a sure recipe for the development of resistance.

In conclusion, while care providers reported awareness of the new government policy on malaria control in pregnancy, this was not borne out in their prescription pattern of drugs for chemoprophylaxis and case management. This is not good for the success of the Global Malaria Control and the RBM strategies which propose to reduce malaria morbidity and mortality among pregnant women. The possible causes for these findings need to be urgently explored and maybe the subject of another study. Efforts at creating awareness should be intensified and the government must seek an effective way of disseminating knowledge.

### Acknowledgements

This study received support from the Senate Research Grant of the University of Ibadan, Nigeria.

## References

1. Akinlêye SO, Falade CO and Ajayi IO. Knowledge and utilization of intermittent preventive treatment for malaria among pregnant women attending antenatal clinics in primary health care centres in rural southwest, Nigeria: a cross-sectional study. *BMC Pregnancy and Childbirth* 2009, 9:28 doi:10.1186/1471-2393-9-28
2. WHO: A Strategic framework for malaria prevention and control during pregnancy in the African region. Volume 01. Brazzaville: WHO Regional Office for Africa; 2004.
3. Akanbi OM, Odaibo AB, Afolabi KA and Ademowo OG: Effect of self-medication with antimalarial drugs on malaria infection in pregnant women in South-Western Nigeria. *Med Princ Pract* 2005, 14:6-9
4. Marchesini P and Crawley J: Reducing the burden of malaria in pregnancy. Mera 2004, Roll Back Malaria Department, WHO, Geneva .
5. Falade CO, Yusuf BO, Fadero FF, Mokuolu OA, Hamer DD and Salako LA. Intermittent preventive treatment with sulphadoxine-pyrimethamine is effective in preventing maternal and placental malaria in Ibadan, south-western Nigeria. *Malaria Journal* 2007, 6:88 doi:10.1186/1475-2875-6-88
6. Kassam SN, Nesbitt S, Hunt LP, Oster N, Soothill P and Sergi C: Pregnancy outcomes in women with or without malaria. *Int J Obs Gynecol* 2006, 93:225-232.
7. WHO: Global strategy plan 2005-2015. 2005 [http://www.rollbackmalaria.org/forumV/docs/gsp\_en.pdf]. World Health Organization, Geneva
8. FMOH: National guidelines and strategies for malaria prevention and control during pregnancy. A publication of the Federal Ministry of Health, Nigeria; Malaria Control Programme, FMOH, Abuja; 2005.
9. Rogerson SJ, Chaluluka E, Kanjala M, Mkundika P, Mhango C and Molyneux ME: Intermittent sulphadoxine-pyrimethamine in pregnancy: effectiveness against malaria morbidity in Blantyre, Malawi in 1997-99. *Trans R Soc Trop Med Hyg* 2000, 94:549-553.
10. van Eijk AM, Ayisi JG, ter Kuile FO, Otieno JA, Misore AO, Odondi JO, Rosen DH, Kager PA, Steketee RW and Nahlen BL: Effectiveness of intermittent preventive treatment with sulphadoxine-pyrimethamine for control of malaria in pregnancy in west- ern Kenya: a hospital-based study. *Trop Med Int Health* 2004, 9:351-360.
11. Challis K, Osman NB, Cotiro M, Nordahl G, Dgedge M and Bergstrom S: Impact of double dose sulphadoxine-pyrimethamine to reduce prevalence of pregnancy malaria in southern Mozambique. *Trop Med Int Health* 2004, 9:1066-1073.
12. Kayentao K, Kodio M, Newman RD, Maiga H, Doumtabe D, *et al.* Comparison of intermittent preventive treatment with chemoprophylaxis for the prevention of malaria during pregnancy in Mali. *J Infect Dis* 2005, 191:109-116
13. Yusuf OB, Dada-Adegbola HO, Ajayi IO and Falade CO. Malaria prevention practices among mothers delivering in an urban hospital in southwest Nigeria. *J Vector Borne Dis* 45, September 2008, pp. 217-224
14. D'Alessandro U, Langerock P, Bennett S, Francis N, Cham K and Greenwood BM. The impact of a national impregnated bednet programme on the outcome of pregnancy in primigravidae in Gambia. *Trans R Soc Trop Med Hyg* 1996; 90: 487-492.
15. ter Kuile FO, Terlouw DJ, Phillips-Howard Pam *et al.* Reduction of malaria during pregnancy by permethrin-treated bednets in an area of intense perennial malaria transmission in western Kenya. *Am J Trop Med Hyg* 2003; 68: 50- 60.
16. Greenwood A, Menendez C, Alonso P, Jaffar S, Langerock P, Lulat S, Todd J, M'Boge B, Francis N and Greenwood B: Can malaria chemoprophylaxis be restricted to first pregnancies? *Trans R Soc Trop Med Hyg* 1994, 88:681-682.
17. Enato EF, Okhamofe AO and Okpere EE: A survey of Knowledge, attitude and practice of malaria management among pregnant women from two health care facilities in Nigeria. *Acta obsetet Gynecol scand* 2007, 86:33-35.
18. Galadanci HS, Ejembi CL, Iliyasu Z, Alagh B and Umar US: Maternal health in Northern Nigeria. A far cry from ideal. *BJOG: An International Journal of Obstetrics and Gynaecology* 2007, 114:448
19. Sirima SB, Sawadogo R, Moran AC, Konate A, Diarra A, Yameogo M, Parise ME and Newman RD: Failure of a chloroquine chemoprophylaxis program to adequately prevent malaria during pregnancy in Koupela District, Burkina Faso. *Clinic Infect Dis* 2003, 36:1374-1382.

Received: 30/08/10

Accepted: 26/10/11