ORIGINAL ARTICLE

THE EFFECT OF INTERMITTENT PREVENTIVE THERAPY FOR MALARIA ON PREGNANCY OUTCOME AT THE UMTH MAIDUGURI.

[1]BAKO B, [1]GEIDAM AD, [1]MAIRIGA AG, [2] MALAH AB, [3] NGADDA H, [3]MUSA AB, [4]SADAUKI HM.

ABSTRACT

Background: The World Health Organisation (WHO) recommends the use of intermittent preventive therapy with sulphadoxine-pyramethamine (IPT-SP) for prevention of malaria in pregnancy and this is the priority of the Roll Back Malaria partnership.

Objectives: To determine the effect of IPT-SP on pregnancy outcome in our environment.

Methods: Four hundred pregnant women among a cohort recruited for a larger study evaluating the prevalence of malaria parasitaemia in pregnancy in UMTH Maiduguri from 24th July 2007 to 12th January 2008 were used for this study. All pregnancies and deliveries were supervised at the UMTH. They were followed from booking to delivery to observe the effect of IPT-SP on pregnancy outcome. Blood samples were collected at booking and delivery for malaria parasite and packed cell volume. Malaria parasite was also looked for in the cord blood and placenta. Socio-demographic characteristics and pregnancy outcome were also obtained.

Results: The mean age and parity of the patients were 27.2±5.5 years and 2.3±2.1 respectively. Majority of the patients (80.0%) have had at least a dose of the IPT-SP. The prevalence of malaria parasitaemia at booking was 60.3% with a mean parasite density of 701.04 ± 382.22parasites/µl. However, the prevalence at delivery fell to 28.8% ($p<0.001$) and the mean parasite density reduced to 405.187 ± 310.43 parasites/µl ($p<0.001$).

In spite of the similar mean parasite density at booking in the 3 groups, the mean parasite density at delivery was lowest in the patients that had 2 doses of IPT-SP and highest among those that did not take IPT-SP ($P<0.001$). The use of IPT-SP also significantly protects from maternal anemia at delivery, preterm delivery, low birth weight, placental malaria, and cord parasitaemia.

Conclusion: There is a high prevalence of malaria parasitaemia with a high parasite density among pregnant women at booking, both of which decline remarkably at delivery most likely due to ITP-SP during antenatal care. It is recommended that the use of intermittent preventive treatment should be intensified.

Key Words: *Intermittent preventive therapy, Malaria, Pregnancy, Maiduguri*

INTRODUCTION

Prevention of malaria in pregnancy is a major public health challenge and a priority of the Roll Back Malaria partnership. There are approximately 300 million people infected with malaria at any one time with one third developing clinical disease.[1] Even the asymptomatic parasitaemia can cause unfavourable pregnancy outcomes.[2-5] Therefore, prevention of malaria in pregnancy is essential.

The WHO currently recommends a three-pronged approach to prevention of malaria in pregnancy in endemic areas, viz: intermittent preventive treatment using sulphadoxine pyrimethamine (ITP-SP), use of insecticide treated net (ITN) and effective case management of malaria illness.

Two to three doses of IPT-SP treatment regimen given once during the second trimester (after quickening) and once or twice during the third trimester is recommended by the WHO, and is being practiced in a number of African countries.[6-8] The IPT-SP has been found to be effective in clearing malaria parasitaemia, reducing the risk of LBW as well as improving maternal packed cell volume in studies in Malawi, Kenya, Mozambique and recently in Ibadan southwestern Nigeria.[6-9]

Since the Abuja declaration on Roll Back Malaria in 2000, the use of IPT-SP has been incorporated in to antenatal care services in Nigeria[10] and delivering this malaria intervention method through antenatal care is a viable option in sub-Saharan Africa where two third of women attend antenatal care at least once during pregnancy.[11]

This was a hospital based prospective study to determine the effect of the currently used intermittent preventive therapy for malaria on pregnancy outcome in our environment.

MATERIALS AND METHODS

This study was conducted among women who participated in a larger prospective observational study evaluating the prevalence of malaria parasitaemia among pregnant women

Affiliation:
[1]Department of Obstetrics and Gynaecology, [2]Department of Haematology, [3]Department of Histopathology, UMTH, PMB 1414 Maiduguri, Borno State.
[4]Compass Nigeria, Asokoro, Abuja.

Correspondence and reprint request to:
DR BAKO B
Department of Obstetrics and Gynaecology
UMTH, PMB 1414 Maiduguri, Borno State
E-mail:-babaganabako@yahoo.com

in UMTH. Recruitment was from a population of pregnant women at booking (irrespective of their gestational age) using stratified random sampling along their sitting position at the booking clinic of UMTH. For this study, women who had antimalarial treatment prior to booking and those with co-existing illnesses such as HIV infection, sepsis, hypertension, diabetes mellitus, and sickle cell disease were excluded. The patients used for this secondary study gave an informed consent. Blood samples were obtained for both packed cell volume and thick blood film for malaria parasite during booking and at delivery using the finger prick. The packed cell volume was estimated microhematocrit reader. Thick blood film was used to look for malaria parasite and where present, estimate the parasite density by Greenwood and Armstrong method.[12] Slides were declared negative if no malaria parasite was seen after examining 30 HPF.

The women were followed up through the antenatal care and were seen according to their appointments. Three tablets of SP containing 500mg sulphadoxine and 25mg pyrimethamine per tablet was prescribed to all patients after quickening and a second dose repeated at least 4-6 weeks after the first dose but before 36 weeks of gestation. All patients were counselled to ensure compliance. Not all the patients had the two doses of IPT-SP because some book late while others did not comply.

At the completion of third stage of labour, malaria parasite was looked for in the cord blood and the placenta. The findings, along with information on age, parity, gestational age at booking, and use of insecticide treated net, gestational age at delivery, baby's birth weight, Apgar scores and symptoms of malaria were entered into a profoma prepared for the study. The data was analyzed using the SPSS version 13 (SPSS, Chicago, IL, USA). Chi-square was use to determine association between categorical variables and scale variable means were compared using ANOVA. Statistical significance was set at $p<0.05$. Ethical clearance for the study was obtained from the Ethical and Research Committee of the UMTH.

Women with PCV <33% were considered anaemic and baby's with birth weight <2.5kg low birth weight. Preterm delivery was when delivery occurred before 37 completed weeks of gestation.

RESULTS

During the study period from 24th July 2007 to 12th January 2008, 480 women who consented for the study were used. However 400(83.3%) of the women completed the study and had complete data for analysis. The mean age and parity of the patients were 27.2±5.5 years and 2.3±2.1 respectively. None of the patients had symptoms of malaria at booking and only 2.3% (9/400) of the women were sleeping

Table 1. Usage and doses of IPT-SP in the study group

Dose of IPT-SP	No of patients	Percentage
1. Two doses	225	56.2
2. One dose	95	23.8
3. None	80	20.0
Total	**400**	**100**

Table 2: Effect of different doses of IPT-SP on malaria parasite density.

Doses of IPT	Mean MP density at Booking	Mean MP density at booking	T	P-value
Two doses	712.72 +686.86	252.58+199.94	9.65	<0.001
One dose	684.07+643.93	418.63+224.56	3.79	<0.001
None	705.66+538.75	705.02+493.84	0.01	<0.994
Total	**701.04+382.22**	**401.17+310.43**	**7.24**	**<0.001**

Table 3: Effect of the different doses of IPT-SP on pregnancy outcome

Pregnancy Outcome	None (%)	1 dose (%)	2 doses (%)
1. MP at delivery			
Yes	62 (77.5)	36 (37.9)	40 (17.8)
No	18 (22.5)	59 (62.1)	185 (82.2)
Total	80 (100)	95 (100)	225 (100)
	$\chi 2$=105.57	P<0.01	
2. Anaemia At Delivery			
Yes	66 (82.5)	39 (41.1)	45 (20.0)
No	63 (17.5)	56 (58.9)	180 (80.0)
Total	80 (100)	95(100)	225 (100)
	$\chi 2$=115.56	P<0.01	
3. Preterm Delivery			
Yes	18 (22.5)	6 (6.3)	11 (4.9)
No	62 (77.5)	81 (93.7)	214 (95.1)
Total	80 (100)	95 (100)	225 (100)
	$\chi 2$=27.9	P<0.01	
4. LBW			
Yes	17 (21.2)	9 (9.5)	8 (3.5)
No	63 (78.8)	86 (90.5)	217 (96.5)
Total	80 (100)	95 (100)	225 (100)
	$\chi 2$=25.29	P<0.01	
5. PM			
Yes	48 (60.0)	35 (36.8)	59 (26.2)
No	32 (40.0)	60 (63.2)	166 (73.8)
Total	80 (100)	95 (100)	225 (100)
	$\chi 2$=34.74	P<0.01	
6. Cord Parasitaemia			
Yes	22 (27.5)	16 (16.9)	42 (18.7)
No	58 (72.5)	79 (83.1)	183 (81.3)
Total	80 (100)	95 (100)	225 (100)
	$\chi 2$=11.76	P<0.01	

MP=malaria parasite. **LBW=**low birth weight. **PM**=placental malaria

under insecticide treated nets.

The use of IPT-SP is showed in table 1. Majority of the patients (56.2%) had two doses of the IPT-SP while 23.8% had only a dose of the IPT-SP. The prevalence of malaria parasitaemia at booking was 60.3% with a mean parasite density of 701.04 ± 382.22 parasites/µl. However the prevalence at delivery fell to 28.8% (P<0.001) and the mean parasite density reduced to 405.187 ± 310.43 parasites/µl (P<0.001).

Table 2 detailed the effect of the different doses of IPT-SP on parasite density change in the three groups of the patients. The mean parasite density was lowest in the patients that had two doses of IPT-SP and highest among those that did not take IPT-SP (P<0.001). This was in spite of the similar mean parasite density at booking in the 3 groups (p>0.05).

Table 3 showed the effect of IPT-SP on pregnancy outcome. The use of IPT-SP significantly protects from preterm delivery, maternal anemia at delivery, low birth weight, placental malaria, and cord parasitaemia.

DISCUSSION

Intermittent Preventive Therapy with Sulphadoxine-Pyrimethamine is currently the recommended regimen for prevention of malaria in pregnancy in endemic areas.[1] A number of randomised controlled trials and prospective studies in East and Southern Africa have demonstrated the efficacy, safety and cost effectiveness of the IPT-SP in malaria prevention during pregnancy[6-8] and similar assertions can also be made for this study. The obvious reduction in both the prevalence and malaria parasite density among the women can be explained by the use of IPT-SP, as the malaria parasite density at delivery was lowest among women that had two doses of the IPT-SP compared to those that had a single dose and those without malaria prophylaxis. Additionally, the use of ITN was very low in the study population.

Anaemia is a well-recognized consequence of malaria. Although maternal anaemia is multifactorial, malaria is known to contribute significantly to its occurrence in pregnancy. The prevalence of anaemia was least among parturient who received 2 doses IPT-SP during pregnancy when compared with the single doses and no prophylaxis groups most likely because of the IPT-SP effect on malaria as demonstrated. This finding is similar to another report from West Africa where IPT-SP was found to be protective against maternal anaemia and placental parasitaemia.[13] Low birth weight (LBW) and preterm delivery were also found to be commoner among women who had no malaria prophylaxis in pregnancy compared to those that had IPT-SP.

The beneficial effect of IPT-SP on reduction of the prevalence of maternal anaemia, LBW and preterm delivery is a welcome finding because it would lead to better pregnancy outcomes. This is because anaemia is associated with poor quality of life and LBW and prematurity are the greatest risk factors for neonatal mortality and a major contribution to infant mortality.[14-16]

CONCLUSION

The use of two doses IPT-SP is effective in reducing malaria parasitaemia among parturient women in our environment. It was also found to improve pregnancy outcomes, by lowering the prevalence of preterm deliveries, LBW, placental malaria and maternal anaemia.

The implementation of the recently adopted IPT-SP strategy if pursued with vigour holds great promise in reducing the burden of malaria in pregnancy in the country especially that even a single dose of it given at booking confer some benefit.

REFERENCES

1. World Health Organisation. Report of a WHO scientific group on practical chemotherapy of malaria, technical report series 1990; 805:1-5.

2. Guyatt LH, Snow RW. The epidemiology and burden of Plasmodium falciparum-related anaemia among pregnant women in sub-Saharan Africa. Am J Trop Med Hyg 2001; 64:3644.

3. Shulman CE, Dorman EK. Importance and prevention of malaria in pregnancy: Trans R Soc Med Hyg 2003; 97(1):30-35.

4. WHO. A Strategic framework for malaria prevention and control during pregnancy in the African region 01. Brazzaville: WHO Regional Office for Africa; 2004.

5. Kassam SN, Nesbitt S, Hunt LP, Oster N, Soothhill P, Sergi C. Pregnancy outcomes in women with or without malaria. Int J Obstet Gynecol 2006; 93:225232.

6. Rogerson SJ, Chaluluka E, Kanjala M, Mkundika P, Mhango C, Molyneux ME. Intermittent sulphadoxine-pyrimethamine in pregnancy: effectiveness against malaria morbidity in Blantyre, Malawi in 199799. Trans R Soc Trop Med Hyg 2000; 94:549553.

7. Van Eijk AM, Ayisi JG, Ter Kuile FO, Otieno JA, Misore AO, Odondi JO et al. Effectiveness of intermittent preventive treatment with sulphadoxine-pyrimethamine for control of malaria in pregnancy in western Kenya: a hospital-based study. Trop Med Int Health 2004; 9:351360.

8. Challis K, Osman NB, Cotiro M, Nordahl G, Dgedge M, Bergstrom S. Impact of double dose sulphadoxine-pyrimethamine to reduce prevalence of pregnancy malaria in southern Mozambique. Trop Med Int Health 2004; 9:10661073.

9. Folade CO, Yusuf BO, Fadero FF, Mokuolu OA, Hamer DH, Salako LA. Intermittent Preventive Treatment is effective in preventing maternal and placental malaria in Ibadan, south-west Nigeria. Malar J 2007; 6:88-90.

10. FMOH. National guidelines and strategies for malaria prevention and control during pregnancy. Federal Ministry of Health Nigeria 2005: Pp. 150.

11. Lives at risk: malaria in pregnancy. www.who.int/features/2003/04b/en (accessed 08/04/2005)

12. Greenwood BM, Armstrong JRM. Comparison of two simple methods for determining malaria parasite density. Trans R Soc Trop Med Hyg 1991; 85:186-188.

13. Kayentao K, Kodio M, Newman RD, Maiga H, Doumtabe D, Ongoiba A et al. Comparison of intermittent preventive treatment with chemoprophylaxis for the prevention of malaria during pregnancy in Mali. J Infect Dis 2005; 191:109116.

14. Kassam SN, Nesbitt S, Hunt LP, Oster N, Soothhill P, Sergi C. Pregnancy outcomes in women with or without malaria. Int J Obstet Gynecol 2006; 93:225232.

15. Van Geertruyden JP, Thomas F, Erhart A, D'Alessandro U. The contribution of malaria in pregnancy to perinatal mortality. Am J Trop Med Hyg 2004; 71: 3540.

16. Aimakhu CO, Olayemi O. Maternal hematocrit and pregnancy outcome in Nigerian women. West Afr J Med 2003; 22: 1821.