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Original Article

Uptake of Monthly Intermittent Preventive Therapy with Sulphadoxine-Pyrimethamine Among Pregnant Women Attending a State Teaching Hospital in Ibadan

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Abstract

Objectives: This study assessed uptake of IPTp-SP among the pregnant women in a state hospital in Ibadan, and factors affecting the uptake. **Methods:** It was a prospective cohort study of 223 pregnant women receiving care at the antenatal clinic of the facility between November 2018 to April 2019. Data was collected using a structured questionnaire and was analyzed using statistical package for social sciences (IBM SPSS, New York) version 21. P<0.05 was considered statistically significant. Chi-square tests was used for bivariate analysis and Ordinal logistic regression was used for multivariate analysis. **Result:** The mean age of the participants was 29.91± 5.46 year with average booking gestational age of 23.26 ±3.99 weeks. Many of the participants took 4 doses (30.5%) while 45 (20.2%) participants had five doses. One hundred and eighty-eight (84.3%) received at least 3 doses of IPTp-SP. The commonest side effects were abdominal pain (OR=26.16, 95% CI =2.77-247.22) and dizziness (OR=5.43,95% CI=1.30-22.75) which were statistically significant on ordinal multivariate logistic regression with number of doses taken. A significant association was found between gestational age at booking (OR=0.64, 95% CI= 0.59-0.70) and number of doses of IPTp-SP taken on multivariate analysis. **Conclusion:** Uptake of monthly IPTp-SP among pregnant women in Adeoyo hospital, Ibadan can be said to be good though associated with some minor side effects which significantly affected the uptake. Early booking was found to allow women to take the minimum of three doses of IPTp-SP recommended by WHO.

Keywords: Malaria, Pregnant, Ibadan, Uptake, IPTp-SP

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Introduction

Malaria is one of the tropical diseases common in Sub-Saharan Africa and it is caused by a protozoan (plasmodium) inoculated into the blood stream by female anopheles mosquitoes causing substantial risks in pregnancy for the women, her foetus and the new born when delivered [1, 2]. The World Health Organisation (WHO) estimates 214 million new

cases of malaria worldwide annually with 90% of cases and about 92% of deaths due to malaria occurring in Sub-Saharan African [3]. Although the disease is preventable, curable and currently receiving global attention, it remains a public health disease with an estimated 219 million cases and 435,000 deaths worldwide in 2017. Most of these deaths (93%) occurred in Africa[4].

Nigeria suffers the world's greatest malaria burden with 97% of the total population at risk of the infection and 51 million cases reported annually complicated with 207,000 deaths[5]. The complications of malaria can be severe in pregnancy and these could be maternal and fetal complications which include anaemia, preterm labour, renal failure, hypoglycaemia, intra uterine growth restriction IUGR, intra uterine fetal death IUFD, low birth weight LBW, placenta parasitisation and congenital malaria[2].

The World Health Organization (WHO) suggested a three-pronged approach to the prevention and control of malaria in pregnancy in steady zones of malaria transmission and this specifically include the use of sulfadoxine-pyrimethamine (IPTp-SP) as preventive therapy against malaria in pregnancy. The other malaria preventive strategies in pregnancy are vector control (which include encouraging pregnant women to sleep under insecticide treated nets, use of mosquito nets in the house, ensuring clean environment, good water drainage system) and early diagnosis of malaria in pregnancy with prompt and effective treatment[6]. In the prophylactic treatment with IPTp-SP, each dose contains three sulfadoxine-pyrimethamine tablets and each tablet contains 500 mg / 25 mg of SP. WHO recommends that IPTp-SP be given with each planned ANC contact, but only starting at early second trimester and doses at least one month apart[6]. The National guideline for prevention of malaria in pregnancy in compliance with WHO guidelines has recommended monthly doses of intermittent preventive therapy with sulphadoxine-pyrimethamine (IPTp-SP) after quickening (16 -20 weeks) for all pregnant women till delivery[7]. However, studies in different regions in Nigeria showed only 10 to 34% of pregnant women received 2 or more doses of IPTp-SP during pregnancy according to report from the National Malaria Elimination Program and ICF International and minimum of three doses of IPTp-SP are required to be taken by every pregnant woman by WHO [6,8].

In order to improve the uptake of IPTp-SP, the Federal Ministry of Health in Nigeria stipulated that SP should be given free of charge through antenatal services using a directly observed therapy DOT[7]. This strategy gives room for proper documentation and monitoring of doses, which is important for success of IPTp-SP. Monthly use IPTp-SP has been approved since 2014 in Nigeria and Adeoyo Maternity Teaching hospital is one of the few hospitals that have implemented this IPTp-SP protocol. It was therefore good to evaluate the uptake of these drugs (IPTp-SP) among the pregnant women. Therefore, this study was carried out to assess number of doses taken by pregnant women, factors affecting their uptake and also the notable side-effects of the monthly IPTp-SP among these pregnant women attending Adeoyo Maternity Teaching Hospital, Ibadan.

Materials and Methods

The study was a prospective cohort study of pregnant women receiving care at the antenatal clinic of the Adeoyo Maternity Teaching Hospital, Ibadan in Oyo State, Nigeria between November 2018 to April 2019. Adeoyo Maternity Teaching Hospital is a government owned secondary health care center. The antenatal clinic section of the department of Obstetrics and Gynaecology has an antenatal booking rate of about 50 pregnant women per week.

The study population consisted of pregnant women who booked and were follow up till end of pregnancy during period of study. Sample size was calculated using the formula n = Z2pq/d2 yielding a minimum sample of 208 with 10% attrition rate and overall, 223 women were recruited. The last normal menstrual period was used to determine the gestational age of the participants and the early ultrasound scan was used for pregnant women who were not sure of their last menstrual period. They were recruited as they presented for booking clinic using the simple random sampling technique with consent given for the study. All recruited women were ensured to have met the inclusion criteria which included consented pregnant women with gestational age ranging from 16weeks to 28weeks and no history of use of sulphadoxine-pyrimethamine in index pregnancy. Pregnant

women with history of allergy to sulphonamides or pyrimethamines, Glucose-6-Phosphate Dehydrogenase (G6PD) deficiency were excluded. Ethical approval was obtained from Oyo State Ethics Review Committee with assigned number: AD/13/479/935B.

Data collected included sociodemographic variables, such as age, marital status and educational level and relevant booking parameters. Number of doses of IPTp-SP taken and side effects were also documented in the questionnaire. Data analysis was done using statistical package for social sciences (IBM SPSS, New York) version 21. Comparison of categorical variables was done using Chi-square tests to measure the statistical significance of the calculated proportions. IPTp-SP intake was grouped into less than three (< 3) IPTp-SP doses (poor uptake) and greater than or equal to three (≥3) IPTp-SP doses (optimal uptake). Ordinal logistic regression was applied to determine the independent associations. Inferential was set at 95% confidence interval, and $P < 0.05$ was considered statistically significant.

Results

Two hundred and twenty-three (223) were recruited into the study. The mean age of the participants was 29.91± 5.46 years. Majority (58.3%) of the participants were less than 30 years while 41.7% were 30 years and above. Most of the participants (96.4%) were married.

Table 1: Sociodemographic characteristics

Variable	Frequency (n=223)	Percent
Age group (years)		
<30	130	58.3
≥30	93	41.7
Mean ± SD	**29.91±5.46**	
Marital status		
Single	8	3.6
Married	215	96.4
Level of Education		
No formal education	1	0.4
Primary	11	4.0
Secondary	103	46.2
Tertiary	108	48.4
Occupation		
Professionals	15	6.7
Skilled workers	29	13.0
Semi-skilled workers	120	53.8
Unemployed	59	26.5
Husband's occupation		
Professionals	37	16.6
Skilled workers	84	37.7
Semi-skilled workers	102	45.7

Table 2: Relevant booking parameters of participants

Variables	Frequency (n=223)	Percentage (%)
Gravidity		
None	2	0.9
1-3	179	80.3
≥4	42	18.8
Mean ± SD	2.48±1.49	
Number of children alive		
None	76	34.1
1-2	122	54.7
3-4	25	11.2
Gestational age at booking (weeks)		
16-20	69	30.9
21-25	75	33.6
≥26	79	35.4
Median	24	
Height (m)		
≤1.5	11	4.9
>1.5	212	95.1
Weight(kg)		
<70	140	62.8
70-89	73	32.7
≥90	10	4.5
Mean ± SD	66.98±11.79	

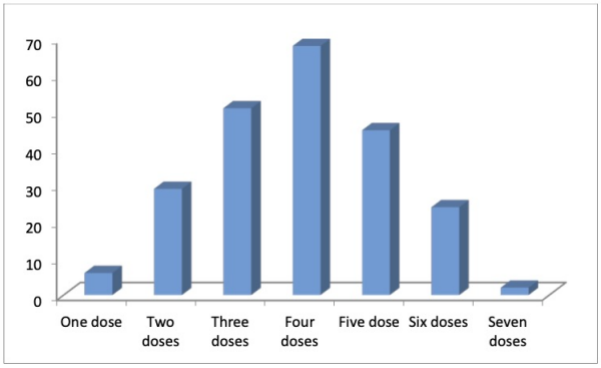

Figure 1: Maximum number of doses of IPTp-SP taken in pregnancy by the participants

Almost half (48.4%) of the participants had tertiary education and 46.2% had secondary education. More than half of the participants were semi-skilled and 26.5 % of them were unemployed while few (6.7%) were professionals (Table 1). Most (80.3%) of the participants has had between one and three pregnancies before this index pregnancy. Only 2(0.9%) of the participants were primigravida. The mean gestational age of the participants was 23.26 ±3.99 weeks at booking. The mean weight for the participants is 66.98 ± 11.79 kg (Table 2). Fig 1 shows the maximum number of doses of IPTp-SP taken by the participants, 6 (2.7%) people took only one dose, majority of the participants took 4 doses (30.5%) while 45 (20.2%) participants had five doses. One hundred and eighty-eight (84.3%) received at least 3 doses of IPTp-SP.

Table 3: Association between relevant obstetrics features and dose of IPTp-SP taken.

Variable	Number of doses		Chi square	P value
	<3 (%) (n=35)	≥3(%) (n=188)		
Age				
<30	15(42.9)	87(46.3)	0.14	0.711
≥30	20(57.1)	101(53.7)		
Parity				
None	0(0.0)	2(1.1)	0.78	0.682
1-3	27(77.1)	152(80.9)		
≥4	8(22.9)	34(18.1)		
Gestational age at booking				
<23	8(22.9)	76(40.4)	3.88	0.049
≥23	27(77.1)	112(59.6)		

Table 4: Association between side effects and dose of IPTp-SP taken.

Variable	Number of doses		Chi square	P value
	< 3(%) (n=35)	≥ 3 (%) (n=188)		
Nausea				
Yes	1(3.5)	7(3.7)	-	1.00*
No	34(97.1)	181(96.3)		
Vomiting				
Yes	5(7.0)	3(1.6)	-	<0.01*
No	30(93.0)	185(98.4)		
Abdominal pains				
Yes	2(5.7)	1(0.5)	-	0.07*
No	33(94.3)	187(99.5)		
Headache				
Yes	11(31.4)	18(9.6)	12.46	< 0.01
No	24(68.6)	170(90.4)		
Dizziness				
Yes	6(17.1)	5(2.7)		<0.01*
No	29(82.9)	134(97.3)		
Insomnia				
Yes	1(2.9)	4(2.1)	-	0.58*
No	34(97.1)	184(97.9)		

*Fisher's exact

A significant association was found between gestational age at booking and number of doses

Table 5. Ordinal Logistic Regression Table with Poor Uptake as the Dependent variable

Variables	Odds ratio	95% Conf. Interval	P > |z|
Nausea	1.21	0.31 - 4.70	0.783
Vomiting	2.01	0.44 - 9.15	0.365
Abdominal pain	26.16	2.77 - 247.22	0.004
Headache	1.67	0.67- 4.15	0.266
Dizziness	5.43	1.30 - 22.75	0.021
GA at Booking	0.64	0.59 - 0.70	0.000

(χ^2=0.049) with participants that booked early in pregnancy having a greater number of doses of IPTp-SP taken as shown in Table 3.

Table 4 shows the association between side effects and dose of IPTp-SP taken. There is a significant association between vomiting (χ^2<0.01), headache (χ^2<0.01), dizziness (χ^2<0.01) and number of doses taken with side effects more common among participants that took less than 3 doses of IPTp-SP. From the multivariate analysis Table 5, abdominal pain (OR=26.16, 95%CI =2.77-247.22), dizziness (OR=5.43, 95%CI=1.30-22.75) and gestational age at booking (OR=0.64, 95%CI= 0.59-0.70) are statistically significant ($p < 0.05$) with number of doses of IPTp –SP taken. Therefore, a patient with abdominal pain has 26 times more odds of not using the drugs while a patient with dizziness has a 5-times more odds of not using it. Patient that booked late has 40% less chance of having optimal dose of IPTp –SP for protection against malaria in pregnancy.

Discussion

This study described the uptake of monthly doses of sulphadoxine-pyrimethamine as intermittent preventive treatment, IPTp-SP with a total of 223 pregnant women recruited. The participants' mean age was 29.91years and standard deviation of 5.46 years with the youngest being 18 years old and the oldest being 45 years old. This is expected since the population of Nigeria is demographically young[9] and this is consistent with the findings of a Tanzanian facility-based cross-sectional research that investigated poor delivery outcomes among women who received IPTp-SP. The authors

reported that study participants were in the age range 18 and 45 year with the mean age being 26.27± 5.42 years suggesting a somewhat more youthful population[10].

The gestational age at booking is believed to be very crucial in determining the total number of IPTp-SP taken in pregnancy. Each participant is expected to have at least 3 doses of IPTp-SP by WHO recommendation[6]. Early registration increases the participants' opportunity of receiving the recommended doses of IPTp-SP provided antenatal clinic (ANC) is attended regularly and SP is available as seen in this study. The median gestational age of first ANC visit among the participants was found to be 24weeks with a range of 16 to 28weeks. Late booking is a feature of antenatal patients in this environment with comparable findings seen in Kano, North west Nigeria, where majority of the women booked in the second trimester (13–24 weeks) and also in keeping with findings from Birnin Kwari in Kaduna State where most of the pregnant women began their antenatal care late with median booking gestation age of 24 weeks (range 12- 34 weeks)[11,12]. A significant association was found between gestational age at booking and number of doses taken which was confirmed even on multivariate analysis. In this study, few of the participants booked for the antenatal care in the first trimester and this has implication on uptake of IPTp-SP and other essential antenatal care services needed in pregnancy to prevent complications[13].

The early attendance of ANC is affected by the intricate choices women make during pregnancy, beginning from accepting the actual pregnancy to recognizing the need for antenatal care[14]. The explanation for the late booking in this study might be related to the women's sociocultural view that pregnancy is not an adverse health condition therefore can be managed in faith-based homes and that only ill individuals need to go to the hospital[15]. Furthermore, the majority of the participants were multiparous women who may show lackadaisical attitude to health care in pregnancy since they are experienced and engrossed more in the care of their children and other home chores than attending to their health needs in pregnancy[14,15].

This study showed that above eighty percent of the pregnant women adhered to the WHO-recommended ≥3 IPTp-SP doses. This figure was higher than reports on uptake of IPTp-SP from Burkina Faso[16], the Western region of Ghana[17] and Tanzania[10]. The high uptake of IPTp-SP gotten in the current study could be due to the strategy used in the administration of the drugs which was direct observed therapy (DOT). Findings from this study have clearly shown that increase in uptake of IPTp-SP among pregnant women is achievable using DOT strategy. One of the major reasons that patients become non adherent to medication is because they forget to take their medications, but when patients take medications in the presence of their care givers, the result is always better than self-administered therapy[18]. The results of a study carried out showed that 49.6% of the patients mentioned forgetfulness as one of the most important involuntary reasons for non-compliance to medications[19]. In addition, because of the shift in malaria epidemiology, parasites that are resistant to sulphadoxine-pyrimethamine are increasingly spreading and gaining dominance. This has necessitated the use of additional treatments such as mefloquine as an IPT in some regions[20,21]. Therefore a proper and regular use IPTp-SP as recommended by WHO is necessary in our environment to prevent resistance to IPTp-SP and reduce the burden of malaria in pregnancy[6,22].

The current study also sought to identify the side effects associated with monthly doses of IPTp-SP. Findings showed that no woman experienced adverse reaction but few experienced minor side effects. The side effects experienced were nausea, vomiting, dizziness, headache, insomnia and abdominal pain, though these were mild as categorized based on severity. Headache was the most common side effect among the participants followed by dizziness which might be one of the reasons few participants took only one or two doses. There is therefore a fear of non-compliance because these side effects from multivariate analysis have tendency to make patients to take fewer and suboptimal number of doses. Thus, patients should be well counselled on the likelihood of these side effects on commencement of IPTp-SP. This finding is similar to those of Filler et.al and Hammer et.al where authors concluded the side effects due to monthly IPTp-SP among respondents were mild and included headache, nausea etc[23,24]. It is also good to note that higher number of doses (i.e. >4 doses) of IPTp-SP was not associated with any adverse reaction contrary to the fear entertained by WHO on the safety of 5 or more doses of IPTp-SP[6,25].

In this study, the effectiveness of the monthly IPTp-SP was not assessed which is one of the study limitations. This would have helped us to appreciate the benefits of monthly IPTp-SP but the study was not set out to achieve this. A control trial study with a larger sample size and use of placebo would have also helped to confirm if the side effects were actually due to the drugs or not. It is recommended that patients should take mild analgesics like acetaminophen with IPTp-SP. since abdominal pain, headache and dizziness were the common side effects of the IPTp-SP in this study. In addition, proper evaluation might be necessary to rule out other causes of these symptoms especially vomiting which could be pregnancy related. Patients should also be counselled on these symptoms which are mild before commencement of the IPTp-SP.

Conclusion

Uptake of IPTp-SP among the participants was good with more than 80% of the participants taking ≥3 IPTp-SP doses and the side effects of IPTp-SP were mild but significantly affected the uptake of IPTp-SP. However, early booking was found to allow women to take the minimum of three doses of IPTp-SP recommended by WHO.

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