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Uptake of Intermittent Preventive Treatment for Malaria and Treatment of Malaria in Pregnancy at a Tertiary Hospital

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Abstract

Background: Malaria is a disease of global health concern; however, it has even a greater impact on people in Sub-Saharan Africa, of which Nigeria is a part. Pregnant women and those who are immunocompromised are more susceptible to malaria and these groups may show life-threatening symptoms, which have led to the recommendation of intermittent preventive treatment for malaria in pregnancy. In spite of this, the prevalence of malaria in pregnant women has remained high, thus the need to study the uptake of IPTp. **Objective:** To determine the uptake of IPTp-SP and its prevention of malaria in pregnancy. **Methods:** This is a cross-sectional study to determine the uptake of intermittent preventive treatment of malaria using sulfonamide-pyrimethamine and its prevention of malaria in pregnancy at Alex Ekwueme Federal University Teaching Hospital, Abakaliki, Ebonyi State. Results were presented in numbers and percentages, and Pearson's correlation and Spearman's correlation were used to analyse the relationship between the number of doses of IPTp-SP and malaria in pregnancy. A p-value of ≤0.05 was taken to be statistically significant. **Results:** Thirty-five women (19.0%) reported using Artemisinin-based Combination Therapy (ACT), and 8 (4.3%) could not recall the drug used for their treatment of malaria. About half of the respondents (93; 50.5%) received four doses, while 39 (21.2%) received five doses. Among those who received four doses of IPTp, 78 respondents had no malaria treatment, while among those with five doses, 36 had no malaria treatment. Whereas majority of those who had lower than 2 doses of SP had more treatments for malaria. The study showed a negative correlation between IPTp-SP dose and frequency of malaria treatment (Pearson $r = -0.351$, Spearman $\rho = -0.373$; $p < 0.001$). **Conclusion:** Most of the women took more than 3 doses of IPTp and those who had malaria had treatment with ACT. Increased doses of IPTp in pregnancy are vital in the prevention

of malaria in pregnancy.

Subject Areas

Gynecology & Obstetrics

Keywords

Intermittent Preventive Treatment, Pregnancy, Malaria

1. Introduction

Malaria is one of the most severe medical diseases of global health importance in Africa and the world at large [1]. In pregnancy, it is associated with maternal anaemia, mortality and adverse pregnancy outcomes like abortions, preterm delivery, intrauterine growth restriction, stillbirth and neonatal mortality [2].

Approximately 214 million cases of malaria occur annually [1], but deaths from malaria and its complications have decreased over the years to about 400,000 in 2018 [3]. Of these 400,000 deaths, 93% of them are in Sub-Saharan Africa [3]. Nigeria has a greater burden of malaria, with about 51 million cases and 207,000 deaths reported annually [1]. Due to innovations in diagnosis, treatment and vaccines, the incidence of malaria has decreased to 30% globally and 34% in Africa between 2000-2013 [1]. Pregnant women living in Sub-Saharan Africa are particularly vulnerable to malaria and its complications [1]. In a study done in Abakaliki in 2009, the prevalence of malaria in pregnant women was 29% [4].

One gets infected with malaria when an infected mosquito takes human blood meal, then transfers the Plasmodium sporozoites from the saliva into the capillary bed of the host. The parasite then migrates to the liver, where it undergoes further replication before it is released into the blood stream of the host. The incubation period from the time of bite to the manifestation of symptoms is between 7 - 30 days. Depending on the Plasmodium species with which an individual is infected, symptoms occur between 2 - 3 days [5].

Some of the symptoms of malaria include: fever, headache, nausea, vomitting and myalgias [5]. Infection by *Plasmodium* spp. of malaria parasite in hyperendemic and areas of stable transmission may be asymptomatic because of acquisition of immunity at an early age. However, in areas of unstable transmission, the risk of complications such as cerebral malaria, respiratory distress syndrome, hemolytic anaemia and hypoglycemia increases [6]. This therefore puts pregnant women, children, persons with coexisting HIV infection and travelers to endemic regions more at risk of morbidity and mortality from malaria infection [5].

Intermittent preventive treatment of malaria in pregnancy using 2 doses one month apart has been used for the prevention of malaria in pregnancy. However, Meta-analysis showed three courses or monthly IPTp to be better [7]. Recent innovations in the diagnosis, treatment and prevention of malaria advocate the use

of intermittent preventive treatment in malaria, which ideally should start at 13 weeks with 4-weekly course of antimalarial sulfadoxine pyrimethamine until delivery [3]. In addition to the administration of intermittent preventive treatment for malaria, high dose folic acid (5 mg) is withheld for two weeks to ensure maximal effect of the drug [8]. Available data showed that percentage of women receiving intermittent treatment for malaria prevention with monthly sulfadoxine-pyrimethamine increased from 2% in 2010 to 31% in 2018 [3].

In spite of the current guideline in the administration of IPTp-SP for prevention of malaria in pregnancy [9], women still suffer from malaria and others have been found to have received fewer than 3 doses at term. This study aims to assess the uptake of IPTp and the relationship between the number of doses of IPTp and the frequency of malaria in pregnancy.

2. Materials and Method

2.1. Study Setting

Alex Ekwueme Federal University Teaching Hospital, Abakaliki, Ebonyi State is a major referral facility for primary, secondary and private facilities within Ebonyi State and other neighbouring states in southeastern Nigeria, and attends to a wide variety of patients, especially those of lower socio-economic status. This hospital conducts an average of 2286 deliveries annually. It has an emergency unit that provides 24-hour service for obstetrics and gynaecology emergencies.

2.2. Study Design

This will be a cross-sectional, observational study involving antenatal women at term attending antenatal clinic at Alex Ekwueme Federal University Teaching Hospital, Abakaliki, Ebonyi State, Nigeria.

2.3. Study Duration

This study lasted for 3 months, from August to October 2025.

2.4. Sample Size Calculation

Formula by Pourhoseingholi *et al.* [10]:

$$\text{Sample size} = \frac{Z^2 P(1-P)}{d^2}$$

where:

Z = standard normal variation 1.96 at 5% type 1 error;

P = expected proportion in previous studies or based on pilot studies;

d = absolute error or precision.

$$\text{Sample size} = \frac{1.96^2 \times 0.31(1-0.31)}{0.07^2}$$

where sample size = 164, with 10% attrition = 184.

2.5. Inclusion Criteria

1) Participants who are booked.
2) Participants who present at term.

2.6. Exclusion Criteria

1) Participants who are on cotrimoxazole.
2) Participants on Paludrine.
3) Participants who react to sulfadoxine-pyrimethamine.

2.7. Sampling Method

This will be consecutive sampling of participants who meet the inclusion criteria.

2.8. Recruitment

Participants who meet the inclusion criteria and who consent to participate in the study will be enrolled in the study.

3. Result

Table 1 shows the socio-demographic characteristics of respondents. The age distribution shows that the majority are within the 21 - 30 years age group (127; 69.0%), followed by 31 - 40 years (54; 29.3%). Most respondents had given birth to two children (60; 32.6%) and three children (43; 23.4%). Those with one child were 37 (20.1%), while 26 (14.1%) were nulliparous. Most respondents were residents in Abakaliki (180; 97.8%), while only 2 (1.1%) each resided in Enugu and Imo, respectively. Almost all the respondents had attained tertiary education (95; 51.6%), while 80 (43.5%) had secondary education. A small number had only primary education (8; 4.3%), and just 1 (0.5%) had no formal education. The largest proportion was traders (79; 42.9%), followed by undergraduates (26; 14.1%), and housewives (24; 13.0%). Other occupations included civil servants (16; 8.7%), farmers (15; 8.2%), seamstresses (9; 4.9%), corps members (7; 3.8%), salon workers (3; 1.6%), and lawyers (3; 1.6%). Only one respondent each was a businesswoman (0.5%) or banker (0.5%). Table 2 evaluates treatment of malaria in the index pregnancy and represents the number of doses of IPT received in pregnancy. Thirty-five women (19.0%) reported using Artemisinin-based Combination Therapy (ACT), and 8 (4.3%) could not recall the drug used for their treatment of malaria. About half of the respondents (93; 50.5%) received four doses, while 39 (21.2%) received five doses. Table 3 showed that among those who received four doses of IPTp, 78 respondents had no malaria treatment, while among those with five doses, 36 had no malaria treatment. Table 4 revealed a significant negative correlation between IPTp-SP dose and frequency of malaria treatment (Pearson $r = -0.351$, Spearman $\rho = -0.373$; $p < 0.001$), confirming that increasing the number of IPTp-SP doses was associated with fewer malaria treatments during pregnancy.

Statistical analysis revealed a significant negative correlation between IPTp-SP

Table 1. Socio-demographic characteristics of respondents.

Variables	Freq. (n = 184)	Percent (%)
Age (years)		
0 - 20	2	1.1
21 - 30	127	69.0
31 - 40	54	29.3
>40	1	.5
Mean ± SD	28.52 ± 4.133	
Parity		
0	26	14.1
1	37	20.1
2	60	32.6
3	43	23.4
4	15	8.2
5	3	1.6
Settlement		
Abakaliki	180	97.8
Enugu	2	1.1
Imo	2	1.1
Educational level		
No formal education	1	.5
Primary education	8	4.3
Secondary education	80	43.5
Tertiary education	95	51.6
Occupation		
Trader	79	42.9
Housewife	24	13.0
Undergraduate	26	14.1
Business woman	1	0.5
Salon	3	1.6
Civil servant	16	8.7
Farmer	15	8.2
Corper	7	3.8
Seamstress	9	4.9
Banker	1	0.5
Lawyer	3	1.6

Table 2. Malaria treatment and IPT doses received.

Variables	Freq. (n = 184)	Percent (%)
What was used in the malaria treatment		
Unknown	8	4.3
ACT	35	19.0
Doses received in pregnancy		
0	3	1.6
1	7	3.8
2	15	8.2
3	27	14.7
4	93	50.5
5	39	21.2

Table 3. IPT doses and number of people treated for malaria.

Variable	How many times did you treat malaria			
	0	1	2	3
Doses received in index pregnancy				
0	2	0	1	0
1	1	5	1	0
2	6	7	2	0
3	18	7	1	1
4	78	9	5	1
5	36	3	0	0

Table 4. Correlation table.

Pearson's correlation	Spearman correlation	Significant
−0.351	−0.373	0.000

dose and frequency of malaria treatment (Pearson $r = -0.351$, Spearman $\rho = -0.373$; $p < 0.001$), confirming that increasing the number of IPTp-SP doses was associated with fewer malaria treatments during pregnancy.

4. Discussion

This research involved 184 pregnant women. The age distribution showed that the majority were within the 21 - 30 years age group, followed by 31 - 40 years. Only 2 women were aged 20 years and below, while 1 (0.5%) was above 40 years. This is slightly in contrast with a previous study in Nigeria, where majority were between 24 - 34 years [11]. Another study done in Cameroon also had majority of

its participants > 50 years [12]. A study done in Ghana agrees with the findings of this study, as 52.0% of the respondents were between 20 - 29 years [13].

Most respondents were multipara, and a smaller proportion had four or five children. Previous studies had similar results as majority of the respondents had given birth to two or more children [13]-[15]. Most respondents were residents in Abakaliki (180; 97.8%), while only 2 (1.1%) each resided in Enugu and Imo, respectively. The majority had attained tertiary education (95; 51.6%), while 80 (43.5%) had secondary education. A small number had only primary education (8; 4.3%), and just 1 (0.5%) had no formal education. This is in contrast with a study in rural parts of Lagos and Kenya in which most of the study participants had secondary education, OND and HND, and in Northern Ghana, where most of the study participants had no formal education [16]-[18]. This could be due to the fact that most of the patients who attend antenatal care in tertiary health facilities are learned people who live more in urban areas. The largest proportion was traders (79; 42.9%), followed by undergraduates (26; 14.1%), and housewives (24; 13.0%). Other occupations included civil servants (16; 8.7%), farmers (15; 8.2%), seamstresses (9; 4.9%), corps members (7; 3.8%), salon workers (3; 1.6%), and lawyers (3; 1.6%). Only one respondent each was a businesswoman (0.5%) or banker (0.5%). This agrees with a study in Kenya and Northern Ghana, which showed that majority of the respondents were unemployed and engaged in different forms of occupation such as trading, business, food vending or farming [17] [18].

Majority of the women who had malaria and were treated reported using Artemisinin-based Combination Therapy (ACT), 8 (4.3%) could not recall the drug used. This corresponds to WHO-recommended use of ACTs in the management of Pf uncomplicated malaria (UM) [19]. This agrees with the findings by Mbassi *et al.* [20]. An animal study by Maafoh *et al.* [21] showed that neem plant was used in the treatment of malaria and that there was elevated PCV in such animal subjects. Use of Neem in humans, especially in the first trimester, could be teratogenic.

More than half of the women received four doses of IPTp-SP, while 39 received five doses. Smaller proportions had three doses (27; 14.7%), two doses (15; 8.2%), one dose (7; 3.8%), and none (3; 1.6%). Study by Desai *et al.* had findings in keeping with this study, as majority of participants took three or more doses of IPTP-SP [7]. Mutanyi *et al.* showed a similar finding as an Optimal IPTp-SP uptake was 79.6% [22]. Study by Boateng *et al.* in Ghana showed that the proportion of uptake of three to five doses of SP were: IPT3 (87.5%), IPT4 (55.7%) and IPT5 (14.5%). The proportion of women who received the first dose of SP at 16 weeks of gestation was 21.3%. Women who made ≥ 4 visits were more likely to receive ≥ 3 doses of SP than those who made < 4 visits [23]. On the other hand, Kalu *et al.* demonstrated a low uptake of at least one IPTp-SP dose [11]. This low uptake is often seen in women who book late for antenatal.

Statistical analysis revealed a significant negative correlation between IPTp-SP dose and frequency of malaria treatment (Pearson $r = -0.351$, Spearman $\rho = -0.373$;

$p < 0.001$), confirming that increasing the number of IPTp-SP doses was associated with fewer malaria treatments during pregnancy.

5. Conclusion

Most of the women took more than 3 doses of IPTp and those who had malaria had treatment with ACT. Increased doses of IPTp in pregnancy are vital in the prevention of malaria in pregnancy. Women are encouraged to book early so as to commence IPTp-SP at earlier gestations.

Conflicts of Interest

The authors declare no conflicts of interest.

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