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Original Article

Factors Influencing the Use of Intermittent Preventive Treatment for Malaria Among Pregnant Women in Rural Communities of Abia State, Nigeria

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ABSTRACT

Background: Malaria in pregnancy (MiP) remains a critical public health concern in Nigeria, with significant implications for maternal and fetal health. Despite national policy guidelines advocating the use of Intermittent Preventive Treatment in pregnancy using Sulphadoxine-Pyrimethamine (IPTp-SP), its uptake remains suboptimal in many rural communities. This study aimed to assess the factors influencing IPTp-SP utilization among pregnant women attending antenatal clinics (ANCs) in rural areas of Abia State.

Methods: A descriptive cross-sectional study design was adopted, involving 422 pregnant women selected through a multistage sampling technique across three predominantly rural Local Government Areas (LGAs): Ugwunagbo, Isiala Ngwa South, and Ukwa East. Data were collected using a structured, interviewer-administered questionnaire and analyzed using SPSS version 25. Descriptive statistics, chi-square tests, and Pearson correlation analyses were employed to examine associations between socio-demographic variables, accessibility, beliefs, health system factors, and IPTp uptake. Statistical significance was set at $p < 0.05$.

Results: The majority of respondents were married (82.0%), aged between 25 and 34 years (46.9%), and had attained at least secondary education (71.1%). Key barriers to IPTp uptake included drug unavailability (30.6%), long waiting times (28.9%), fear of side effects (19.4%), and cultural beliefs (23.0%). Notably, only 24.6% reported consistent IPTp-SP availability during ANC visits, and 46.4% had to purchase the drugs outside the clinic. Correlation analysis revealed significant associations between IPTp uptake and distance to clinic ($r = -0.412$, $p = 0.001$), health education ($r = 0.562$, $p < 0.001$), drug availability ($r = 0.489$, $p = 0.002$), and cultural beliefs ($r = -0.297$, $p = 0.012$). Chi-square analysis confirmed significant relationships between IPTp uptake and education level ($\chi^2 = 19.438$, $p = 0.001$), awareness ($\chi^2 = 24.511$, $p < 0.001$), and satisfaction with ANC services ($\chi^2 = 14.257$, $p = 0.003$).

Conclusion: The study highlights multifaceted determinants affecting IPTp-SP uptake among pregnant women in rural Abia State. These include socio-demographic factors, health system challenges, cultural beliefs, and availability of services. Interventions aimed at increasing awareness, ensuring consistent drug availability, and improving ANC service delivery are critical to enhancing IPTp coverage in rural Nigeria.

Key words: Intermittent Preventive Treatment, Malaria in Pregnancy, Antenatal Care, Rural Healthcare, Health Service Delivery.

INTRODUCTION

Malaria remains a significant public health challenge in Nigeria, particularly among pregnant women in rural communities. [1] Malaria during pregnancy can lead to severe maternal and neonatal complications, including maternal anemia, low birth weight, preterm delivery, and increased perinatal mortality. [2] To mitigate these risks, the World Health Organization (WHO) recommends intermittent preventive treatment in pregnancy (IPTp) using sulfadoxine-pyrimethamine (SP) as a preventive measure. This strategy involves administering SP to pregnant women at scheduled antenatal care (ANC) visits, starting in the second trimester, regardless of whether the woman is infected with malaria. [3] Despite the adoption of this policy in Nigeria, the uptake of IPTp remains suboptimal, especially in rural areas. [4]

Several factors influence the utilization of IPTp among pregnant women. These include individual-level factors such as knowledge and attitudes towards IPTp, socio-demographic factors like education and employment status, and health system factors including availability of SP, health worker practices, and ANC service delivery. [5] For instance, studies have shown that women with higher educational levels and those whose spouses are educated are more likely to utilize IPTp. Additionally, early booking for ANC and multiple ANC visits are associated with increased IPTp uptake. [6]

Health system challenges also play a significant role. Stock-outs of SP, lack of directly observed therapy (DOT) during ANC visits, and inadequate health worker knowledge about IPTp protocols hinder effective implementation. [7] Moreover, financial barriers, such as out-of-pocket payments for SP, and socio-cultural factors, including misconceptions about malaria prevention, further impede IPTp utilization. [8] In Abia State, Nigeria, there is limited data on the specific factors influencing IPTp uptake among pregnant women attending ANC in primary health care centers, particularly in rural communities. Understanding these factors is crucial for designing targeted interventions to improve IPTp coverage and, consequently, maternal and neonatal health outcomes. This study therefore sought to investigate the factors influencing IPTp-SP utilization among pregnant women attending antenatal clinics (ANCs) in rural areas of Abia State.

MATERIALS AND METHODS

Study design

This study was a descriptive cross-sectional survey aimed at assessing the factors influencing the use of Intermittent Preventive Treatment (IPTp) for malaria using Sulphadoxine-Pyrimethamine (SP) among pregnant women in the selected rural communities.

Study area

The study was conducted in selected rural communities of Abia State, located in the southeastern region of Nigeria. Abia State is administratively divided into 17 Local Government Areas (LGAs), out of which Ugwunagbo, Isiala Ngwa South, and Ukwa East LGAs were purposively selected for this research due to their predominantly rural characteristics, high malaria burden, and significant numbers of antenatal clinic attendees. The rural communities selected were typified by limited healthcare infrastructure, poor health-seeking behaviors, and a high prevalence of malaria in pregnancy (MiP). These LGAs were also characterized by widespread use of primary and secondary healthcare facilities for antenatal services.

Study population

The target population for this research comprised pregnant women attending antenatal clinics at the selected public healthcare facilities within the rural LGAs during the study period. These women, regardless of their gestational age, represented the primary focus for evaluating awareness, access, and utilization patterns related to IPTp services.

Inclusion and exclusion criteria

The study included pregnant women of any gestational age who were attending ANC clinics in the selected health facilities and who voluntarily gave informed consent to participate in the study. The exclusion criteria involved pregnant women who were critically ill, unable to respond to the questionnaire, or who declined to participate in the study.

Sampling techniques

A multistage sampling technique was utilized in selecting the study respondents. In the first stage, the researchers purposively selected Ugwunagbo, Isiala Ngwa South, and Ukwa East LGAs based on documented malaria prevalence and accessibility as provided by the Abia State Ministry of Health.

In the second stage, a comprehensive list of all public primary and secondary health facilities offering antenatal care services within the selected LGAs was obtained from the Abia State Ministry of Health. Using simple random sampling, a proportional number of healthcare facilities were selected from each LGA to ensure representativeness.

In the third and final stage, the researchers employed a consecutive sampling technique to recruit all consenting pregnant women who were attending antenatal clinics on the scheduled clinic days in the selected health facilities during the study period. Inclusion criteria consisted of pregnant women of any gestational age who gave informed consent, while exclusion criteria included those who were critically ill or declined participation.

Sample size determination

The sample size was calculated based on Cochran's formula for population proportion estimation, following the methodology described by Ezebuiro et al. [9]:

$$n = \frac{Z^2 (Pq)}{e^2}$$

The formula components are defined as follows:

- n represents the minimum required sample size.
- Z is set at 1.96, corresponding to a 95% confidence level.
- P denotes the established prevalence of adequate knowledge or practice of IPTp in Nigeria.
- e signifies the allowable margin of error, fixed at 5% (0.05).
- $q = 1 - p$

A recent study conducted by Orish et al. reports that 52.1% had average knowledge or practice of IPTp. [10]

$$P = 52.1\% = 0.521$$

$$q = 1 - 0.521$$

$$= 0.479$$

$$n = \frac{(1.96)^2 (0.521 \times 0.479)}{(0.05)^2}$$

$$n = \frac{3.8416 \times (0.249559)}{0.0025}$$

$$n = \frac{0.9587}{0.0025} = 383.48$$

Although the initially calculated minimum sample size was 383, it was increased to 422 to accommodate an anticipated 10% non-response rate.

Data collection instrument and procedure

Data were collected using a structured, interviewer-administered questionnaire, which was designed based on literature reviews and relevant indicators from national and global malaria control guidelines, including the World Health Organization (WHO) recommendations. The questionnaire was pretested in a non-study rural LGA to ensure validity and reliability, and necessary modifications were made before the actual data collection commenced.

The researchers trained field assistants—primarily nurses and community health extension workers—on the objectives of the study, ethical procedures, and methods of questionnaire administration to ensure uniformity and accuracy. Interviews were conducted in English and local dialects (mainly Igbo) to accommodate the varying literacy levels among participants.

Ethical considerations

Permission was obtained from the respective health facility managers. Each participant was informed of the study's purpose, the voluntary nature of participation, and their right to withdraw at any time without consequences to their care. The researchers ensured that confidentiality was maintained by assigning unique identification codes rather than recording personal identifiers.

Data management and analysis

Upon completion of data collection, all questionnaires were manually checked, coded, and entered into a computer using the Statistical Package for the Social Sciences (SPSS) version 25.0. Descriptive statistics such as frequencies, means, and percentages were used to summarize the socio-demographic and clinical characteristics of the respondents. Awareness and usage levels of IPTp-SP were analyzed and categorized based on predefined criteria. Bivariate analysis using Chi-square tests was conducted to determine associations between socio-demographic variables and IPTp usage. A *p*-value of <0.05 was considered statistically significant.

RESULTS

As shown in (**Table 1**), the majority of respondents were aged 30–34 years (24.2%), married (82.0%), and had secondary education (41.7%). Most participants were Christians (87.0%), and the predominant occupations were farming (23.2%) and trading (21.6%). Parity was highest among those with 3–4 children (41.7%), and most were in their second trimester (44.3%).

Table 1: Socio-demographic information

Variable	Frequency	Percentage (%)
Age		
<20 years	28	6.6
20–24 years	57	13.5
25–29 years	96	22.7
30–34 years	102	24.2
35–39 years	81	19.2
≥40 years	58	13.8
Marital status		
Single	39	9.2
Married	346	82.0
Divorced/separated	18	4.3
Widowed	19	4.5
Educational level		
No formal education	43	10.2
Primary education	79	18.7
Secondary education	176	41.7
Tertiary education	124	29.4
Occupation		
Unemployed	65	15.4
Farmer	98	23.2
Trader	91	21.6
Artisan	49	11.6
Civil servant	72	17.1
Others	47	11.1
Religion		
Christianity	367	87.0
Islam	28	6.6
Traditional	17	4.0
Others	10	2.4
Parity		
0	42	10.0
1–2	139	32.9
3–4	176	41.7
≥5	65	15.4
Trimester		
First trimester	86	20.4
Second trimester	187	44.3
Third trimester	149	35.3

(**Table 2**) indicates that most respondents lived within 1–5 km of a healthcare facility (42.9%), primarily used public transport (36.5%), and about 46.4% had to purchase IPTp-SP from outside the clinic. Although 24.6% reported IPTp-SP was always available, 39.8% stated it was only sometimes available.

Cultural and personal beliefs, as shown in (**Table 3**), suggest that while 78.9% believed traditional methods alone could not prevent malaria, 38.9% still used herbs, with over half of these using them alongside IPTp-SP (56.1%).

Barriers to IPTp uptake (**Table 4**) included long waiting times, with 62.5% experiencing them often or always. Fear of side

Table 2: Accessibility and availability

Question	Response Option	Frequency	Percentage (%)
How far is the nearest primary healthcare center from your residence?	<1 km	62	14.7
	1–5 km	181	42.9
	6–10 km	106	25.1
	>10 km	73	17.3
How do you usually get to the healthcare center?	Walk	128	30.3
	Public transport	154	36.5
	Private transport	109	25.8
	Others	31	7.3
Is IPTp-SP always available at the clinic during your visit?	Always	104	24.6
	Sometimes	168	39.8
	Rarely	93	22.0
	Never	57	13.5
Have you ever had to buy IPTp-SP from outside the clinic?	Yes	196	46.4
	No	226	53.6
If yes, was the cost affordable to you?	Yes	148	75.5
	No	48	24.5

Table 3: Cultural and personal beliefs

Question	Response Option	Frequency	Percentage (%)
Do you believe malaria can be prevented by traditional methods alone?	Yes	89	21.1
	No	333	78.9
Do you think traditional beliefs discourage women from using IPTp-SP?	Yes	132	31.3
	No	290	68.7
Do you or your family members use herbs to prevent or treat malaria?	Yes	164	38.9
	No	258	61.1
If yes, do you use them alongside or instead of IPTp-SP?	Alongside	92	56.1
	Instead of	36	22.0
	Not applicable	36	21.9

Table 4: Barriers to IPTp uptake

Barrier	Never	Sometimes	Often	Always
Long waiting time at the facility	51 (12.1%)	107 (25.4%)	142 (33.6%)	122 (28.9%)
Fear of side effects from the drug	88 (20.9%)	143 (33.9%)	109 (25.8%)	82 (19.4%)
Negative attitude of healthcare workers	69 (16.4%)	111 (26.3%)	129 (30.6%)	113 (26.8%)
Lack of money for transportation	47 (11.1%)	96 (22.7%)	144 (34.1%)	135 (32.0%)
Non-availability of IPTp drugs	59 (14.0%)	113 (26.8%)	121 (28.7%)	129 (30.6%)
Poor awareness of the benefits of IPTp	76 (18.0%)	138 (32.7%)	124 (29.4%)	84 (19.9%)
Cultural or religious beliefs against medication in pregnancy	91 (21.6%)	126 (29.9%)	108 (25.6%)	97 (23.0%)

effects, negative attitudes of healthcare workers, financial constraints, and cultural beliefs were also frequently cited.

(**Table 5**) reveals health system and service delivery factors: although only 31.3% reported consistent IPTp-SP availability, 69.7% indicated healthcare workers were willing to administer it. Most received health education during antenatal care (75.1%) and considered services to be of good or excellent quality (67.3%). Still, 59.0% reported long waiting times.

(**Table 6**) shows statistically significant correlations: longer distances to the clinic (r = -0.412, p = 0.001), fear of side effects (r = -0.361, p = 0.006), and cultural beliefs (r = -0.297, p = 0.012) were negatively associated with IPTp uptake. Positive correlations were found with health education (r = 0.562, p < 0.001) and drug availability (r = 0.489, p = 0.002).

Chi-square analysis (**Table 7**) revealed significant associations between IPTp uptake and education level (p = 0.001), awareness

Table 5: Health system and service delivery factors

Question	Response Option	Frequency	Percentage (%)
Is IPTp-SP always available at the clinic?	Yes	132	31.3
	No	107	25.4
	Sometimes	183	43.4
Are healthcare workers willing to administer IPTp?	Yes	294	69.7
	No	68	16.1
	Not sure	60	14.2
Do you receive health education about malaria/IPTp during ANC?	Yes	317	75.1
	No	105	24.9
Are IPTp drugs provided free of charge at your ANC facility?	Yes	212	50.2
	No	144	34.1
	Don't know	66	15.6
How would you rate the overall quality of ANC services?	Excellent	108	25.6
	Good	176	41.7
	Fair	99	23.5
	Poor	39	9.2
Are health workers knowledgeable about IPTp-SP?	Yes	294	69.7
	No	69	16.4
	Not sure	59	14.0
Do health workers explain the importance of IPTp-SP?	Yes	301	71.3
	No	121	28.7
Do you feel comfortable discussing concerns with health workers?	Yes	288	68.2
	No	134	31.8
Are there long waiting times before receiving IPTp-SP?	Yes	249	59.0
	No	173	41.0
Is the clinic environment clean and conducive to ANC?	Yes	328	77.7
	No	94	22.3

Table 6: Correlation analysis

Variables Correlated	Pearson's r	p value	Significance
Distance to clinic & IPTp uptake	−0.412	0.001	Significant
Waiting time & satisfaction	−0.379	0.003	Significant
Health education & IPTp uptake	0.562	0.000	Highly Significant
Cultural beliefs & IPTp uptake	−0.297	0.012	Significant
Drug availability & IPTp uptake	0.489	0.002	Significant
Fear of side effects & IPTp uptake	−0.361	0.006	Significant

$p < 0.05$ is considered significant.

Table 7: Chi-square analysis

Variables	Chi-square (χ^2)	df	*p* value	Significance
Education level & IPTp uptake	19.438	3	0.001	Significant
Marital status & IPTp uptake	3.872	3	0.275	Not significant
Religion & IPTp uptake	6.321	3	0.097	Not significant
Awareness of IPTp & uptake	24.511	1	0.000	Highly significant
Traditional belief use & IPTp uptake	11.692	1	0.001	Significant
Availability of IPTp-SP & uptake	17.034	2	0.000	Significant
ANC service satisfaction & IPTp uptake	14.257	3	0.003	Significant

$p < 0.05$ is considered significant.

($p < 0.001$), traditional belief use ($p = 0.001$), availability of IPTp-SP ($p < 0.001$), and ANC service satisfaction ($p = 0.003$). Marital status and religion were not significantly associated.

DISCUSSION

This study explored the factors influencing the use of intermittent preventive treatment with sulfadoxine-pyrimethamine (IPTp-SP) among pregnant women attending antenatal clinics in rural primary healthcare centers of Abia State, Nigeria. The majority of respondents were aged 25–34 years, married (82.0%), and had secondary (41.7%) or tertiary (29.4%) education. Chi-square analysis confirmed a statistically significant association between education level and IPTp uptake ($p = 0.001$), aligning with findings from Obasohan et al., who reported that women with higher education levels demonstrated better IPTp compliance in rural Nigeria due to improved awareness and autonomy in healthcare decisions. [11] Conversely, marital status and religion did not significantly influence IPTp uptake, contrary to some studies suggesting that spousal support plays a role in maternal health service utilization. [12]

Distance to health facilities significantly influenced IPTp uptake ($r = -0.412$, $p = 0.001$). Nearly 42.9% of respondents lived within 1–5 km of the nearest facility, yet long distances for others (>10 km) likely hindered regular ANC attendance. This finding corresponds with Exavery et al., who identified travel burden as a barrier to ANC service utilization in Tanzania. [13] Additionally, although more than half of respondents (53.6%) reported not needing to purchase IPTp-SP externally, 46.4% had to do so, and among them, 24.5% found the cost unaffordable. Drug stock-outs were also prevalent, with only 24.6% affirming that the drug was always available—a significant predictor of IPTp uptake ($p = 0.000$), echoing findings by Oyegoke et al. in Southwestern Nigeria. [14]

Healthcare system performance emerged as a critical determinant. Most respondents (75.1%) received health education on IPTp, and this strongly correlated with IPTp uptake ($r = 0.562$, $p = 0.000$), underlining the pivotal role of targeted ANC-based education. The significance of this variable is supported by findings from Peters and Naidoo, who emphasized that quality maternal education improves adherence to malaria preventive interventions. [15]

However, service quality issues such as long waiting times (59.0%) and negative attitudes of healthcare workers (26.8% reported always experiencing this) were frequently cited. Long waiting times negatively correlated with patient satisfaction ($r = -0.379$, $p = 0.003$). Similar barriers were documented by Hill et al., who reported that health facility inefficiencies discourage consistent ANC attendance and IPTp uptake in Sub-Saharan Africa. [16]

Cultural practices remain a non-negligible barrier. About 38.9% of respondents used herbs for malaria prevention/treatment, with 22.0% using them as substitutes for IPTp-SP. The correlation between cultural beliefs and IPTp uptake was statistically significant ($r = -0.297$, $p = 0.012$), and confirmed via chi-square analysis ($p = 0.001$). These findings echo those of Berchie et al., who found that herbal medicine use and reliance on traditional beliefs undermined IPTp compliance in Nigeria. [17]

Fear of side effects was another deterrent (reported "often" or "always" by 45.2%), and it significantly affected IPTp uptake ($r = -0.361$, $p = 0.006$). This concern is substantiated by Okedo-Alex et al., who noted that misconceptions about IPTp side effects were major deterrents in rural Nigerian communities.[18]

Awareness remains a cornerstone of IPTp use. Among respondents, awareness significantly predicted IPTp uptake ($\chi^2 = 24.511$, $p = 0.000$), consistent with prior studies. [19, 20] Notably, 71.3% stated that health workers explained IPTp-SP benefits, which reinforces the significance of communication in public health interventions.

About 67.3% of respondents rated ANC services as good or excellent, and service satisfaction was statistically associated with IPTp uptake ($p = 0.003$). Moreover, 68.2% felt comfortable discussing concerns with health workers, underlining the relevance of interpersonal care quality. Clean and conducive environments (reported by 77.7%) also enhanced service perception, resonating with findings from Odetola in rural Nigerian contexts. [21]

This study's strength lies in its comprehensive multivariate assessment in a rural Nigerian context where malaria in pregnancy remains a public health challenge. However, the reliance on self-reported data introduces potential recall bias, and findings may not be generalizable beyond similar rural settings.

CONCLUSION

The use of IPTp-SP among pregnant women in rural Abia State is influenced by a nexus of socio-demographic, accessibility, cultural, and systemic health delivery factors. While educational status, drug availability, and health

education positively influenced uptake, barriers like long distances, fear of side effects, cultural beliefs, and inadequate service delivery negatively impacted usage. Addressing these through multisectoral strategies, including improving health system efficiency, strengthening health education, ensuring constant drug availability, and community sensitization, will enhance IPTp uptake and improve maternal and neonatal health outcomes in malaria-endemic settings.

AUTHORS' CONTRIBUTION

Each author has made a substantial contribution to the present work in one or more areas including conception, study design, conduct, data collection, analysis, and interpretation. All authors have given final approval of the version to be published, agreed on the journal to which the article has been submitted, and agree to be accountable for all aspects of the work.

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CONFLICT OF INTEREST

None.

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