

**CHOICE AND REJECTION OF MALARIA CONTROL INTERVENTION IN
PREGNANCY:
SURVEY OF ANTENATAL CAREGIVERS IN EDO STATE, NIGERIA**

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Abstract

Background: Malaria remains a serious challenge to health providers in Nigeria, affecting the economy nationally and at the individual level. The prophylactic use of sulphadoxine/pyrimethamine, called intermittent preventive treatment (IPT), is currently the prophylactic strategy for malaria prevention in Nigeria.

Objective: This study aimed to assess the opinions and preferences of healthcare implementors of the IPT policy compared to an alternative strategy called intermittent screening and treatment (IST) of malaria in pregnancy.

Method: Semi-structured qualitative interviews were conducted among healthcare providers in study facilities where a clinical trial was conducted. These clinical trials compared the clinical outcomes of intermittent preventive therapy (IPT) and intermittent screening and treatment (IST) using malaria rapid diagnostic test (mRDT). These qualitative findings provided indications of providers' preference for either intervention.

Results: More (55%) health providers preferred IST to IPT (41%), and being responsible for prescribing in their respective facilities was found to significantly ($p < 0.05$) influence their choice for IST over IPT for malaria in pregnancy. Most of the reasons for this choice revolved around the consideration that IPT is treatment without indication compared with the motivation to take the drug based on investigational findings (through IST) that there is a malaria parasite in the blood.

Conclusion: Most health providers in these settings preferred IST to IPT for malaria in pregnancy. This choice, however, was not without the recognition that the mRDT needs to work better than they have experienced so far. Therefore, staff training on the principles of IST and the use of mRDT is required to implement an IST programme.

Keywords: Choice/rejection, Antenatal caregivers, in-depth interview, malaria in pregnancy, prevention

Introduction

Malaria remains a significant global health problem, with an estimated 229 million cases in 2019 in 87 malaria-endemic countries⁽¹⁾. Twenty-nine countries accounted for 95% of malaria cases globally. Sub-Saharan Africa accounted for 92% and 93% of the estimated global cases and deaths, respectively^(1,2). Nigeria (27%), the Democratic Republic of Congo (12%), Uganda (5%), Mozambique (4%) and Niger (3%) accounted for about 51% of all cases globally⁽¹⁾. Malaria has remained a serious challenge to healthcare delivery in Sub-Saharan Africa, defying available eradication measures. Several drugs have revolutionised the treatment of malaria over the years, with each new drug initially showing high success against the disease but often failing at the end due to the development of resistance by the plasmodium parasite. Pregnant women, HIV/AIDs individuals and children below 5yrs are the most vulnerable population susceptible to the risk and consequences of malaria. Africa still bears 80% of the global burden of malaria, and Nigeria accounts for about 25% of the global burden⁽³⁾.

Malaria infection during pregnancy poses a substantial risk to the mother, fetus, and neonate. First and second pregnancies have a greater risk of malaria consequences than subsequent pregnancies. Malaria can lead to severe and untreated maternal anaemia, low birth weight and jaundiced babies, miscarriage, preterm labour, and maternal and fetal deaths^(4,6). Malaria parasitemia in pregnancy is most significant in the second trimester when immunity

is much reduced with gestational age, which may span through to the early post-partum stage. The national malaria control programme of the federal ministry of health, in conjunction with the World Health Organization (WHO), has implemented several interventions to reduce this problem, including prompt malaria case detection and management, distribution of long-lasting insecticidal nets (LLINs) and intermittent preventive treatment (IPT) using a sulfadoxine-pyrimethamine combination⁽⁷⁾ but the menace persist.

The IPT policy in Nigeria recommends that at least two doses of SP be administered in the second and third trimesters at least one month apart as a directly observed treatment (DOT). This policy is failing due to increasing cases of resistance to SP and poor policy compliance by both users and providers, and the effectiveness of SP is now in question⁽⁸⁾. Several antimalarials have been tried as alternatives to SP for IPT^(9;12). However, none has demonstrated potential for implementation because they lack sufficient data on efficacy and safety in pregnancy and convenience of administration as enjoyed by SP over the years⁽¹³⁾. Intermittent screening and treatment (IST) have been tried as an alternative to IPT for controlling malaria in pregnancy. The result showed that the IST strategy is not inferior to IPT⁽¹²⁾. Though promising, the IST strategy will likely face the challenge of cost and acceptability by pregnant women and service providers. However, if IST is linked to or incorporated into the routine antenatal care (ANC) package delivered to pregnant women, what will be the views of service providers at that level of care?

Current interventions, including long-lasting insecticide nets, IRS, IPT and case management in the community, will only be effective if they are accessible, acceptable and adequately used within the community⁽¹⁴⁾. The caregivers working in the community are responsible for assuring these. The knowledge, experience and perceptions of providers of an IST programme for control of malaria in pregnancy are estimated to influence its acceptability for adoption into the mainstream care delivered to pregnant women at ANC. This paper attempts to find out these qualitatively. Qualitative research has become essential for randomised controlled trials (RCTs). Qualitative research alongside RCTs helps explain why an intervention works or does not work⁽¹⁵⁾.

Methods

Ethical Issues

Ethical clearance was obtained from the Ethics & Research Committee of the University of Benin Teaching Hospital (UBTH) and the Ethical Committee of Edo-State Hospitals Management Board prior to the commencement of the study. In addition, written informed consent was obtained from all providers in the study facilities willing to participate before they were interviewed.

Study Design

This was a cross-sectional qualitative survey conducted at the exit of a randomised control trial (RCT) in Edo state to compare the effectiveness of IPT and IST in controlling malaria in pregnancy.

Study Centers

The study was conducted in six centres: Referral Medical Centre (RMC) Afuze, General Hospital (GH) Afuze, Sure-P Clinic Otuo, Sure-P Clinic Ugbekun and Central Hospital Benin City, Edo State. Authorities and staff of the antenatal units of all the study centres were briefed on the purpose and process of the study and the assistance and cooperation the research team will need from them. This was done before the commencement of client recruitment. Referral Medical Centre Afuze, General Hospital Afuze and Sure-P clinic Otuo are all located in Owan East Local Government area of Edo State. Also, Sure-P clinic Ugbekun and Central hospital Benin are located in Benin City, the state capital. Intermittent preventive treatment (IPT) policy is a practice in all the study centres to prevent malaria in pregnancy. However, the antimalarial supply is poor, and the directly observed treatment (DOT) for the administration of the IPT policy is lacking in most of the study centres. It is reported that Edo State has a malaria prevalence of 35% by RDT and 18.6% by microscopy in children 6 – 59 months old and 7 – 8 months of seasonal transmission⁽¹⁶⁾. Antenatal clinic uptake in the state capital is high compared to rural areas for reasons ranging from socio-economic, traditional beliefs and preoccupation of the pregnant women. In addition, ANC services in the state public health institutions are free with minimal charges at enrolment and for some laboratory investigations. In all the study sites, there was no existing policy of scheduled screening of pregnant women for malaria parasites on their clinic visit days. However, those who presented with complaints and symptoms suggestive of malaria were referred to the laboratory to run the test. Facility surveys and in-depth interviews of health personnel in these facilities were conducted between July and August 2015, just prior to the exit of the RCT.

Facility Survey

A structured survey of each of the health facilities involved in a multicenter randomised clinical trial (RCT) to compare IST and SP-IPT intervention for control of MIP was conducted to determine the personnel profile, laboratory and dispensary services, availability of antimalarials and malaria rapid diagnostic tests (mRDT) services in the ANCs.

In-depth Interview

Semi-structured qualitative interviews were conducted on healthcare providers in the study facilities who; (i) had been in the facility for at least the last six months, (ii) rendered care to pregnant women during ANC visits, (iii) were present at the facility on the day of the interview; (iv) agreed to be interviewed and. Data saturation was reached when 29 health providers were interviewed. Beyond this, there were no new themes. Interview topics covered participants' demographics, clinic responsibilities, knowledge of IPT policy, experiences of using RDT, perceptions, experience and choice for IST or IPT under investigation in their facility. Also, whether or not they would be willing to participate in IST should it be routine care in their facility. Names of study participants were coded and identified by such codes during the interview and in the report. Names of human study participants are documented but hidden from the study report on ethical grounds. All interview sessions were conducted in English and were electronically recorded using a handheld audio recorder (SONY).

Data Analysis

Data were analysed using thematic analysis. Transcriptions and interview notes from the IDIs were analysed using a coding scheme developed from the questions together with themes that emerged from the data. As previously described, a content analysis was done on identified themes based on the providers' opinions and experiences⁽¹⁷⁾. The qualitative findings indicated providers' choice or rejection of either intervention. This, combined with facilities and personnel audits, will predict the suitability of IST as an alternative approach for preventing malaria in pregnancy.

Results

Facility survey

Of all the five study facilities, only the facilities located within the state capital (Sure-P clinic Ugbekun and Central hospital Benin) had antenatal halls where pregnant women sit to receive health education and be attended. None of the primary healthcare centres had a Pharmacist. In all centres with laboratory services, such laboratories are located away from the ANC. Antimalarials are lacking in most of the facilities for IPT and the treatment of clinical cases. All the primary healthcare centres had mRDT kits (Table 1).

Table 1. Facility survey

Variables	GHA	RMCA	SPCO	SPCU	CHB
Structures					
ANC hall	Nil	None	Nil	Yes	Yes
Laboratory services	Yes*	Yes*	Nil	Nil	Yes*
Pharmacy/Dispensary	Yes	Yes	Nil	Nil	Yes
Scanning services	Nil	Nil	Nil	Nil	yes
Medical Record	Nil	Yes	Nil	Nil	Yes
Staff					
Nurses	6	5	4	5	8
Doctors	2	2	1a	Nil	>5
Pharmacist	1	Nil	Nil	Nil	1
MedRecord Officer	1	Nil	Nil	1	7
Comm. Health Officer	Nil	7	3	6	Nil
Comm. Health Extension workers	Nil	2	1	2	Nil
Laboratory Scientist	1	1 ^a	Nil	Nil	>3*
Availability of antimalarials					
Sulphadoxine/Pyrimethamine	Nil	Yes	Yes	Nil	Yes
Artemeter/Lumefantrine (A/L)	Nil	Nil	Nil	Yes	Yes
Availability of mRDT kits					
	Nil	Yes	Yes	Yes	Nil

*Centrally located away from ANC ^aCorper

In-depth interview participants' demographic profile

Seventy-six per cent of the interviewed participants were females. The majority (62%) were aged above 40yrs. Ninety-three per cent are married, about half are nurses, while the remaining half is distributed across other health providers. More (52%) respondents had not spent more than 2yrs attending to ANC women in their respective facilities (Table 2.)

Table 2. In-depth interview participants' demographic profile.

	SPCU	SPCO	RMCA	CHB	GHA	Total
Sex						
Male	0	0	2	3	2	7
Female	7	2	5	6	2	22
Age (yrs)						
25-30	1	1	2	0	0	4
31-35	1	0	3	0	1	5
36-40	0	0	0	1	1	2
41-45	2	0	2	6	1	11
>45	3	1	0	2	1	7
Marital status						
Single	0	0	1	0	1	2
Married	7	2	6	9	3	27
Profession						
Nurse	4	1	2	5	2	14
Pharmacist	0	0	0	1	1	2
Doctor	0	0	1	3	0	4
Community Health	2	1	3	0	0	6
Lab scientist	0	0	1	0	1	2
Medical record officer	1	0	0	0	0	1
Years in facility						
0-2	4	1	3	1	0	9
3-5	1	0	4	4	2	11
>5	2	1	0	4	2	9
Years in ANC						
0-2	5	2	3	5	0	15
3-5	1	0	4	2	4	11
>5	1	0	0	2	0	3

Reported risks and consequences of malaria in pregnancy

Anaemia or low packed cell volume (65%), intrauterine fetal death (41%) and miscarriage (45%) are the most reported risks and consequences of malaria in pregnancy, while congenital malaria, intrauterine growth retardation and malnutrition are the least reported (Table 3.)

Table 3. Reported risks and consequences of malaria in pregnancy

Identified risks and consequences	Proportion reporting (%)
Anaemia or Low pack cell volume (PCV)	65
Premature or preterm delivery	24
Abortion or miscarriage	45
Intrauterine foetal death (IUFD)	41
Maternal death	17
Jaundiced babies	31
Low birth weight babies	10
Others	31

Others: Congenital malaria, intrauterine growth retardation, loss of appetite, malnutrition, body weakness

Reported measures for the prevention of malaria

Eighty-four per cent of providers reported using insecticide-treated nets (ITNs) as a measure for malaria prevention. This was followed by proper environmental sanitation (63%), while community education, good nutrition and frequent malaria screening were the most minor reported measures (Table 4.)

Table 4. Reported measures for prevention of malaria

Preventive measures	Proportions reporting (%)
Use of insecticide treated net (ITN)	84
Observance of personal hygiene	16
Use of insecticide residual sprays (IRS)	16
Community education	5
Feeding on good nutrition	10
Frequent malaria parasite screening	5
Proper environmental sanitation	63

The proportion of providers' knowledge of the IST strategy prior to the study in their facility

Only 36% of the health providers interviewed had foreknowledge of IST strategy for preventing malaria in pregnancy prior to the study conducted in their facility, while the rest had not (Table 5.).

Table 5. Proportion of Participants knowledge of IST strategy before the study in their facility

Profession	Awareness (%)	
	Yes	No
Nurse (n=13)	10	38
Pharmacist (n=2)	3	3
Medical doctor (n=4)	10	3
CHO/CHEW (n=7)	10	10
Lab Scientist/Technician (n=2)	0	7
Medical Record Officer (n=1)	0	3
Total	36	64

Predictors of knowledge of Intermittent preventive treatment (IPT)

Ninety-three per cent of respondents reported that they are aware of the IPT policy for preventing malaria in pregnancy. However, only 59% of them appear to understand its implementation well. Furthermore, the knowledge of its mode of implementation was found to be significantly influenced by respondents' profession ($p=0.002$) and is responsible for prescribing ($p=0.015$) in the facility (Table 6.).

Table 6. Predictors of knowledge of Intermittent preventive treatment (IPT)

Predictor	Good knowledge	Poor knowledge	P-value
Training on MIP			
Yes	8	3	p=0.351
No	8	8	
Profession			
Nurse/midwife	8	6	p=0.002*
Pharmacist	1	1	
Medical doctor	3	1	
CHO/CHEW	1	2	
Lab Scientist/Tech	0	1	
Responsibility for prescribing			
Yes	13	4	p=0.015*
No	3	7	
Responsibility for dispensing			
Yes	11	4	p=0.080
No	5	7	
Time spent at ANC service			
0-2yrs	10	4	p=0.661
3-5yrs	5	5	
>5yrs	1	2	

* $P < 0.05$ **Predictors of choice of intervention and willingness to conduct mRDT**

More (55%) health providers preferred IST over IPT (41%), and 72% indicated a willingness to participate in the malaria screening with RDT should it be adopted in their facility for pregnant women. Furthermore, being responsible for prescribing was found to significantly ($p=0.04$) influence the acceptability of IST over IPT, while being responsible for dispensing significantly ($p=0.026$) influenced the willingness to participate in mRDT screening (Table 7).

Table 7. Predictors of choice of intervention and willingness to conduct mRDT

Predictor	Acceptability			P-value	Willingness to run mRDT		P-value
	IST	IPT	Both		Yes	No	
Training on MIP							
Yes	6	5	0		7	1	
No	10	7	1	0.71	14	3	1.00
Profession							
Nurse/midwife	7	6	1		10	3	
Pharmacist	2	0	0		2	0	
Medical doctor	1	3	0	0.90	0	1	0.34
CHO/CHEW	3	3	0		6	0	
Lab Scientist/Tech	2	0	0		2	0	
Medical record officer	1	0	0				
Responsibility for prescribing							
Yes	6	10	1		12	1	
No	10	2	0	0.04*	9	3	0.32
Responsibility for dispensing							
Yes	7	7	1		14	0	
No	9	5	0	0.46	7	4	0.026*
Time spent at ANC service							
0-2yrs	9	5	1		13	2	
3-5yrs	5	6	0	0.73	7	1	0.39
>5yrs	2	1	0		1	1	

* $P < 0.05$ **Reasons for the choice of one intervention over the other**

The most reported reason (37%) for the choice of IST over IPT for preventing malaria in pregnancy is that providers considered IPT as treatment without indication or blind treatment and considered screening and treatment to be better. This was followed by the intention to avoid the adverse effects of sulphadoxine/pyrimethamine (26%). On the other hand, the most reported reason (33%) for the choice of IPT over IST is because of the reported ineffectiveness or lack of sensitivity of the mRDT kits and the consideration that

malaria is endemic in the region (27%). Therefore, a small proportion preferred and suggested adopting both strategies (Table 8.)

Table 8. Reasons for the choice of one intervention over the other

Reasons outlined for choices	Proportion reporting (%)
Reasons for the choice of IST (n=16)	
Prefer IST but decried the poor sensitivity of mRDT	21
Due to adverse effects of Sulphadoxine/Pyrimethamine	26
Due to poor compliance with the IPT and SP	5
Screen and treat(IST) is better than blind treatment(IPT)	37
Sulphadoxine/Pyrimethamine is not curative	5
Screen and treat mRDT+ve women but give SP to mRDT-ve women	5
Reasons for the choice of IPT (n=13)	
mRDT is not effective (sensitive)	33
High cost of screening compared to cheap SP	13
Malaria is endemic here, there will always be parasite in the blood	27
Because prevention is better than cure	13
mRDT does not detect placental malaria (the focus of IPT)	7
Screen and treat mRDT+ve women but give SP to mRDT-ve women	7

Discussion

Acceptability studies of health interventions have reported the importance of the opinions of providers and users of such interventions to their successful implementation^(15;18;19). In this study, most facilities lack the basic amenities and human resources to support health interventions to the required level effectively. In all the facilities, there is no laboratory specifically situated to take care of the investigational needs of ANC attendees. In many instances, pregnant women had to travel several kilometres to conduct simple laboratory investigations to bring back the result to the facility for further care. The primary healthcare centres were found to be loaded with lower cadre staff (CHOs and CHEWs). At the same time, the secondary health facilities are understaffed compared to the number of pregnant women seeking care at such facilities. Only one facility (Central Hospital Benin) had sufficient stock of antimalarials (artemether/lumefantrine and Sulphadoxine/Pyrimethamine) throughout our study period, while others had none at all or experienced frequent stockouts. In these centres, pregnant women had to travel to distant places to purchase medications they should readily get as part of the ANC package. This has tremendous implications for malaria prophylaxis and treatment for pregnant women seeking care in such facilities. Most providers interviewed were women, and married, which is a reflection of the gender composition of the staff in the respective antenatal units, as most of them were females.

In this interview, respondents' report on the risk and consequences of malaria in pregnancy revealed that anaemia is the most commonly reported, followed by miscarriage, intrauterine fetal death (IUID) and preterm delivery. This reflects that anaemia is the earliest danger sign of malaria in pregnancy and, with increasing severity and absence of treatment, progresses to more severe complications and death. These reported consequences are everyday experiences of pregnant women with untreated malaria, as in previous reports^(20;22). First and second pregnancies are most at risk of these consequences. The use of long-lasting insecticide-treated nets (LLINs) along with vector control strategies are significant parts of Nigeria's national malaria control programme, as recommended by the world health organisation⁽²³⁾. This is evident in the more significant proportion of providers reporting these as measures for preventing malaria in the community. IPT, though a policy in the country of which

most health providers are aware, this study reveals that many providers in these settings poorly understand the basic principles behind the IPT strategy. Provider profession and schedule of duty in rendering care to pregnant women were found to significantly ($p=0.002$ and $p=0.015$ respectively) influence providers' knowledge and understanding of the IPT principle to the extent that as high as 41% of those who prescribed the SP-IPT for the pregnant women had poor knowledge of the IPT principle. Intermittent preventive treatment (IPT) of malaria during pregnancy is based on the assumption that every pregnant woman living in areas of high malaria transmission has malaria parasites in her blood or placenta, whether or not she has symptoms of malaria.

The policy requires all pregnant women in their second and third trimesters to take a single dose of SP at 4 weeks intervals to suppress a presumed subclinical Plasmodium infection. IPTp-SP is being given as part of the antenatal packages to be administered under directly observed therapy (DOT). The other co-founding factors were not statistically significant. However, more than half of the providers preferred the IST strategy compared with IPT. This indicates that IST as a strategy for the control and prevention of the adverse consequences of malaria in pregnancy is generally a more acceptable intervention for implementation despite their low awareness of it. Training on malaria in pregnancy, profession and schedule of duty at the ANC affected the acceptability profile but only prescribing responsibility was significant ($P=0.04$). Some reasons advanced by providers for accepting IST over IPT are as presented:

'Some women do not cooperate to take the fansidor® (SP) even when given free, but if after a test, they know they have malaria, they will take the medicine' (CB₂, Nurse).

It is commonplace among pregnant women to be unwilling to take drugs, usually because of side effects⁽²⁴⁾, more so that SP is given to them without visible indication. This reveals that existing indication is a stronger motivation for such a category of people to take any drug.

'Fansidor (SP) is like those drugs you just take three start; it does not cure malaria.'
(RMC₃, Nurse).

Views like this held by providers have been shown to constitute an important barrier to adherence⁽²⁵⁾ and show the need for routine updates of providers on the principles of health interventions to improve adherence and confidence in the service provided through such interventions.

'To take any drugs, there must be an indication, but the problem is with the false negative results with mRDT kits, if the kits are working fine and indeed there is no parasite in the blood, there is no need to overload anybody with unnecessary drugs (SP) and so the IST is the best' (CB₅, Pharmacist).

More than three-quarters of respondents expressed willingness to participate in the screening programme using mRDT in their facility. All the primary healthcare facilities studied are already using mRDT to screen pregnant women and others who visit the ANC with complaints or signs of malaria. No matter how good a health intervention is, its successful implementation depends mainly on the acceptability of such intervention by users and providers and their willingness to practice it. With the high acceptability rate of IST and the willingness to practice mRDT for malaria prevention in pregnancy expressed by providers in this study and other studies⁽²⁶⁾, one can only conclude that the stage is ripe for large-scale implementation and surveillance of the IST strategy. Despite the high acceptability of IST for malaria in pregnancy for various reasons, the feasibility of its large-scale implementation remains a long way to come. This is due to the high report of the low sensitivity of the mRDT kits to detect low parasite load. Providers expressed that the mRDT has not been sensitive enough to guarantee its use confidently. Most negative results with mRDT have been doubted by users and providers. This has partly affected their acceptability of the IST programme using RDT and has shown a preference for IPT using SP.

'I do not trust the mRDT because it keeps saying negative, but when I used microscopy, it was 2+. This is my personal experience with the RDT' (RMC₁, Nurse).

'We are aware, we are in an endemic malaria area; there is virtually no one you catch on the street in Nigeria whose blood will not have elements of plasmodium. So if the kits are sensitive and accurate, combined with human resources training for the use of it, then the IST becomes a cost effective and efficient method' (RMC₆, Medical doctor).

'At times you will be seeing all the symptoms of malaria, but when you do the test (with RDT), it will show negative. This is a challenge, prevention, they say, is better than cure.'
(X₇, Nurse).

These submissions suggest much still has to be done to improve the sensitivity of the mRDT for it to be accepted with confidence and ultimately push aside the IPT strategy. Studies have reported the poor sensitivity of the mRDT compared to microscopy, the gold standard⁽²⁷⁾. Interesting, as these findings may be, the limitation (if any) may

be that bias may arise from Hawthorn Effect⁽²⁸⁾ because it was not possible for the clinic staff to be blinded from the experiments as part of the study was done in collaboration with them. However, this study adds to the literature by documenting the acceptability or otherwise of IPTp and ISTp as a pointer for future modification of malaria control programme implementations in general and in the study facilities.

Conclusion

Despite the low awareness of the intermittent screening and treatment (IST) and complaints about the mRDT used for malaria screening in pregnancy as expressed by providers in these study settings, they still recognise its benefits and prefer the IST over IPT for control of malaria in pregnancy. However, they noted with concern the poor sensitivity of the RDT to detect malaria parasites in many instances. They advocated improvement in the technology to remove any doubt in its output. Implementing IST for malaria in pregnancy will require staff training on the use of mRDT and adherence to standard treatment guidelines for clinical malaria.

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