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MISSED OPPORTUNITIES FOR INTERMITTENT PREVENTIVE TREATMENT FOR MALARIA IN PREGNANCY IN NIGERIA: EVIDENCE FROM DEMOGRAPHIC AND HEALTH SURVEY IN NIGERIA 2013

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ABSTRACT

***Background*: Malaria is of global health concern particularly among pregnant women. Nigeria contributes largely to global burden but coverage of Intermittent Preventive Treatment of malaria in pregnancy using Sulphadoxine pyrimethamine remains low. This study was conducted to determine the national situation of missed opportunity for IPTp-SP and attempted to look at correlates and predictors.**

***Method:* The study used secondary data analysis of the Nigeria Demographic Health Survey, 2013. Data on socio-demographics, ANC characteristics and IPTp-SP use during pregnancy among 6,910 women aged 15-49 years who delivered in the last two years with at least 4 ANC visits were analyzed. Missed opportunity for IPTp delivery was defined as an ANC visit where IPTp was not delivered as per the policy. Data was analyzed using SPSS version 21. Associations used Chi-square test and significant variables were fit into multivariate logistic regression model. All analyses were performed at 5% level of significance.**

***Results:* National prevalence for missed opportunity for IPTp-SP was high (73.4%). Predictors of missed opportunity are being of poorer, middle and richer wealth index (OR=0.737, CI 0.566-0.960); (OR=0.659, CI 0.521-0.833); (OR=0.686, CI 0.550-0.857), residence in South East OR=0.549, CI (0.415-0.726) and in the North West (OR=0.176, CI 0.133-0.232). Other predictors are having a primary and secondary education and presenting for the first ANC visit in the second trimester OR=0.739, p=0.024, CI (0.569-0.961).**

***Conclusion:* Missed opportunity for IPTp-SP was high. The need for stronger governmental commitment to upscale uptake of IPTp-SP by incorporating the knowledge of socio-economic, cultural and demographic barriers to accessing IPTp is paramount.**

Keywords: Missed opportunity, Malaria in pregnancy, Nigeria.

INTRODUCTION

Malaria is the second commonest infectious disease with a high mortality globally, with the greatest burden of morbidity and mortality in sub-Saharan Africa. This represents over 90% of global deaths.[1] Although, there is a general risk for malaria within the population, there is an increased vulnerability of some population groups to this disease. In Sub-Saharan Africa, high risk population groups include pregnant women, infants, children less than five years of age, patients with HIV/AIDS, non-immune migrants, mobile populations as well as travelers.[2] Malaria in pregnancy (MiP) has remained a major public health issue with documented adverse effects on both mother and child. Maternal consequences of MiP include high blood parasitaemia and maternal anemia while consequences to the child includes miscarriages and low birth weight (LBW) which is further compounded by attendant sequel of sickness and death in infancy through the mechanism of Intrauterine Growth Restriction (IUGR) and preterm delivery.[3,4]

Intermittent preventive treatment of malaria in pregnancy using Sulphadoxine- pyrimethamine (IPTp-SP) was one of three interventions designed by World Health Organization (WHO) to control MiP especially in malaria endemic regions where pregnant women are required to receive at least two doses of IPTp after quickening till birth. This is based on the assumption that every pregnant woman living in malaria endemic area with or without symptoms of malaria

has malaria parasites in her blood or placenta, with increased susceptibility in the second and third trimester of pregnancy.[3] In 2012, the WHO updated recommendations for IPTp-SP now stipulated that commencing from the second trimester; all pregnant women take Sulphadoxine-pyrimethamine at each scheduled antenatal care visit (ANC), with doses given at least one month apart under the supervision of a trained health care practitioner. This recommendation was a sequelae to evidences showing low uptake of IPTp-SP, believing that the new recommendation will ensure that a greater proportion of women receive at least three doses of SP during each pregnancy.[4] In spite of this modification, IPTp-SP uptake in sub-Saharan Africa still remains largely sub-optimal.[5] This sub-optimal IPTp-SP uptake within the context of high ANC attendance represents significant missed opportunities for IPTp-SP at ANC facilities.[6] Consequently, an ANC visit with non delivery of IPTp-SP as per policy is termed a missed opportunity which is measured in this study as the number of pregnant women with less than two IPTp-SP uptake despite four ANC visits.[7] Due to the integration of IPTp-SP to ANC, this programme's uptake is also subject to overwhelming challenges which are influenced by supply and demand for ANC services, general health systems weakness as well as socio-economic, demographic and cultural barriers to accessing health.[9,10,11] Hence, the progress recorded in the battle against the prevention of the occurrence of malaria in pregnancy has been much slower compared to that against malaria in the general population in the last 16 years.[8]

Evidences have shown that among pregnant women in Sub- Saharan African countries in 2010, the average coverage of at least two doses of IPTp was 14% with a marginal increase in uptake to 24% in 2013. This was found to be well below global and national target of 80% coverage for IPTp-SP. In Africa, only six countries reached the Roll Back Malaria (RBM) coverage target of 60% in 2006 while none has met the 2010 target of 80%.[6] A 2014 WHO report revealed that in 2013, of the 35 million pregnant women at risk for MiP approximately half of them did not receive a single dose of IPTp-SP. In the same year, IPTp adoption was implemented in 35 countries in malaria endemic African countries, but only 57% of pregnant women in those countries received at least one dose of IPTp. Following the updated WHO recommendation on IPTp-SP use for the prevention of malaria in pregnancy, only nine of the 35 countries have reported to the WHO on the recommended number of three or more doses of IPTp, while 17% of pregnant women received three or more doses within those countries.[9] This represents a huge gap for missed opportunities for the prophylaxis of malaria in pregnancy.

In Nigeria, studies have shown large disparities in prevalence rates for malaria in pregnancy across different parts of Nigeria, ranging from 19.7% to 72.0%.[10] Documented evidences of uptake of IPTp-SP in Nigeria typify the African picture. Reports from the Nigeria Demographic Health Survey 2013 showed that of all pregnant women interviewed, only 15% received IPTp-SP during ANC and less than 10% received 3 or more doses of IPTp-SP.[11] Findings also show that uptake of IPTp-SP in Nigeria is low, while its level of missed opportunity remains high.[12,13] This observation in addition to evidence of Nigeria's huge contribution to the global burden of malaria emphasizes the need to assess how well the nation has performed in terms uptake of IPTp among pregnant women nationally. The aim of this study was to determine the prevalence and predictors of missed opportunity for IPTp among a nationally representative sample of women who had at least one delivery within two years of the study. Findings from this study will provide information which could assist national working groups on malaria prevention in pregnancy to prioritize and implement appropriate strategies which address the challenges facing the uptake of IPTp-SP in Nigeria.

METHODS

We carried out a secondary analysis of data from the 2013 National Demographic and Health Survey (NDHS);[11] a nationally representative population-based cross-sectional survey involving data collection from selected locations in the 36 states of the Federation and the Federal Capital Territory. Permission to use the NDHS dataset was obtained from the MEASURE DHS program.

The study population was randomly selected using a three step stratified sampling method. Stratification was achieved by separating each state into urban and rural areas. Selected localities were used in the first stage, enumeration areas in the second and a fixed number of household were selected through equal probability sampling for the third stage. All women aged 15-49 who were either permanent residents of the selected households or visitors who stayed in the households the night before the survey were eligible to be interviewed.

The women's health questionnaire was administered to women aged 15-49 years where a sample of 37,928 individuals was originally drawn. For the purposes of this study a total of 6910 women whose most recent pregnancy resulted in a live birth in the past 2 years

with more than 4 ANC visit were analyzed. Respondents were recategorized into proportion receiving less than or more than two doses of IPTp-SP. As nearly all surveys were conducted before the updated WHO policy in 2012 emphasizing dosing of IPTp-SP at each ANC visit, the proportion receiving two or more doses of IPTp-SP was used as the primary comparison in this analysis.

Relevant questions were identified from the women questionnaire dataset. To ensure that calculated estimates were independently observed from recent births, analyses was performed using information on the most recent pregnancy resulting in a live birth within the last two years prior to survey date. Data on pregnancy, ANC attendance and Sulphadoxine pyrimethamine use were extracted from the survey and analyzed using SPSS statistical package (version 21). The data was weighted using the women individual sample weight. The independent variables were derived from the socio-demographic details of the women while the dependent variable used for this study was missed opportunity for IPTp-SP. Missed opportunity among women whose most recent pregnancy resulted in a live birth in the past 2 years in percentage was defined as:
Women aged 15-49 who had a live birth 2 years preceding the survey and who attended ANC at least 4 times in their last pregnancy and received less than 2 doses of IPTp.

Total number of women aged 15-49 who had a live birth 2 years preceding the survey and who attended ANC at least 4 times in their last pregnancy.

Bivariate analyses of selected socio-demographic characteristics were associated with missed opportunity for IPTp-SP. Statistical significance level was set at P <0.05. Multivariate logistic regression analysis was carried out to identify predictors of missed opportunity for IPTp-SP in the study population.

RESULTS

This study analyzed socio-demographic and health data of 6,910 women aged 15 to 49 years who gave birth within two years of the survey and had made a minimum of four antenatal care (ANC) visits during the last pregnancy. Socio-demographic characteristics are presented in Table 1. The mean age of the women was 28.69±0.19 years, with majority 5028 (72.8%) of the eligible respondents within the age group of 20-34 years. The Hausa/Fulani tribe comprised about a quarter, 1753 (25.4%) of the sample of women. The highest level of education for 2867 (41.5%) of the respondents was secondary education. Most of the respondents 6558 (94.9%) were currently in union or living with a partner, 1976 (28.6%) were in the richest wealth quintile and 3614 (52.6%) were Christians. Table 2 shows the proportion of missed opportunity for the preventive treatment of malaria in pregnancy in Nigeria (representing the proportion of women who received less than two doses of IPTp-SP despite a minimum of four ANC visits). Observed prevalence of missed opportunity using the previous WHO recommendation of at least 2 doses in each pregnancy was 4984 (73.4%). Higher rates 6103 (88.6%) of missed opportunity for IPTp-SP was reported using the 2012 updated WHO recommendation for the preventive treatment of malaria in pregnancy where a minimum of three doses of SP is recommended per pregnancy. Table 3 presents findings on the association between selected factors and missed opportunity for IPTp-SP among the respondents in Nigeria. The highest rates of missed opportunity for IPTp-SP were reported among women who have completed secondary education (78.5%) while the lowest rates (61.6%) were reported among women with no education (p<0.001).

Table 1: Socio-demographic characteristics of the study respondents

Variables N=6910	n (%)
Respondents age group (years)	
<20	418 (6.1)
20-34	5028 (72.8)
≥35	1464 (21.2)
Mean age in years	28.69±0.19
Ethnicity	
Yoruba	1375 (19.9)
Igbo	1288 (18.6)
Hausa/Fulani	1753 (25.4)
Others	2493 (36.1)
Highest level of education	
No education	1807 (26.1)
Primary education	1467 (21.2)
Secondary education	2867 (41.5)
Higher/Tertiary education	769 (11.1)
Living status of respondents	
Never in union	207(3.0)
Currently in union living with partner	6658 (94.9)
Formerly in union living with partner	145 (2.1)
Wealth Index	
Poorest	607 (8.8)
Poorer	1086 (15.7)
Middle	1466 (21.2)
Richer	1776 (25.7)
Richest	1976 (28.6)
Religion* N=6866	
Christian	3614 (52.6)
Islam	3217 (46.9)
Traditionalist	35 (0.5)
*Missing data	44

**Missed data*

Table 2: Rates of missed opportunity for the preventive treatment of malaria in pregnancy in Nigeria in 2013 at IPTp-SP <2 doses

Using 2 doses as standard for determining missed opportunity for IPTp-SP			
Variables N=6910	**n (%) Yes**	**95% Confidence Interval**	**p-value**
Missed opportunities**	4984 (73.4)	71.8,75.0	<0.001*
No missed opportunities	1804 (26.6)	25.0,28.2	
Missing data	122		
Using 3 doses as standard for determining missed opportunity for IPTp-SP			
Missed opportunities	6103 (88.6)	87.5,89.6	<0.001*
No missed opportunities	775 (11.4)	10.4,12.5	
Missing data	122		

**Statistically significant*

*** At the time of data collection, the definition of missed opportunity was determined as less than two doses of IPTp-SP despite four or more ANC visits*

Table 3: Correlates of missed opportunity for IPTp-SP in Nigeria

Variable N=6910	**Missed opportunity**		**95% Confidence Interval**	**x^2**	**p-valu**
	Yes (%)	**No (%)**			
Age of respondent (years)					
<20	72.4	27.6	66.8,77.3	2.431	0.425
20-34	73.9	26.1	72.2,75.6		
>35	72.2	28.0	69.1,74.8		
Missing data	122				
Highest level of education					
No education	61.6	38.4	58.2,64.9	175.250	<0.001
Primary education	75.9	24.1	73.2,78.4		
Secondary education	78.5	21.5	76.4,80.5		
Higher/Tertiary education	77.1	22.9	73.1,80.7		
Missing data	122				
Wealth index					
Poorest	69.3	30.7	65.0,73.3	69.670	<0.001
Poorer	68.9	31.1	65.0,72.5		
Middle	70.8	29.2	67.3,74.0		
Richer	72.2	27.8	69.0,75.2		
Richest	80.2	19.8	77.6,82.6		
Missing data	122				
Religion					
Christian	81.7	18.3	79.9,83.4	264.863	<0.001
Islam	64.3	35.7	61.6,66.8		
Traditionalist	83.6	16.4	67.5,92.6		
Missing data	165				
Type of place of residence N=6910					
Urban	76.0	24.0	73.8,78.0	23.571	0.001*
Rural	69.6	29.2	68.4,73.0		
Missing data	122				
Parity					
1-2	76.1	23.9	74.1,78.1	25.662	<0.001
3-4	73.5	26.5	70.9,76.0		
>4	69.6	30.4	66.9,72.2		
Missing data	122				
Timing of first ANC (months)					
≤3	75.3	24.7	72.7,77.8	9.939	0.038*
4-6	72.1	27.9	70.2,74.0		
>6	76.7	23.3	71.8,81.0		
Missing data	144				
Type of care provider					
No care/care by others	75.2	24.8	70.8,79.1	1.243	0.416
Care by Skilled birth attendant	73.3	26.7	71.5,74.9		
Missing data	158				

**Significant*

Women in the richest cadre of the wealth index reported a missed opportunity of 80.2% compared to 68.9% among women in the poorer wealth quintile (p<0.001). With respect to religion, rates of missed opportunities for IPTp-SP ranged from 64.3% among those practicing Islamic religion to 83.6% among traditional religion adherents (p<0.001). Age of the respondents was not significantly associated with missed opportunity.

It further describes the rates for missed opportunity for IPTp-SP among respondents in Nigeria by type of place of residence, pregnancy characteristics and type of care provider in pregnancy. Rates of missed opportunity for IPTP-SP were higher among respondents in urban (76.0%) than rural (69.6%) areas (p=0.001); rates were also highest among women who reported a parity of one to two (76.1%) compared to their counterparts who had a parity of four and above (69.6%) (p<0.001). Approximately 77.0% of women with timing of their first ANC in the third trimester reported as missed opportunity for IPTp-SP compared to 72.1% of women whose first ANC was in the second trimester (p=0.038). There was no significant association between type of care-giver during ANC and missed opportunity.

Table 4: Predictors of missed opportunity for IPTp-SP among respondent in Nigeria

Variable	Adjusted Odds	95% Confidence Interval		p-value
		Upper	Lower	
Age of respondents (years)				
<20	1.201	0.890	1.621	0.231
20-34	1.087	0.929	1.271	0.297
≥35	1			
Highest level of education				
No education	0.936	0.676	1.296	0.690
Primary education	1.402	1.062	1.851	0.017*
Secondary education	1.344	1.065	1.695	0.013*
Higher/Tertiary education	1			
Wealth index				
Poorest	0.952	0.697	1.302	0.759
Poorer	0.737	0.566	0.960	0.024*
Middle	0.659	0.521	0.833	0.001*
Richer	0.686	0.550	0.857	0.001*
Richest	1			
Religion				
Christian	0.768	0.314	1.875	0.562
Islam	0.353	0.147	0.845	0.020*
Traditionalist	1			
Type of place of residence				
Urban	0.955	0.800	1.139	0.607
Rural	1			
Region of residence				
North central	0.324	0.239	0.438	<0.001*
North east	0.365	0.281	0.475	<0.001*
North west	0.176	0.133	0.232	<0.001*
South east	0.549	0.415	0.726	<0.001*
South south	0.860	0.630	1.176	0.345
South west	1			
Parity				
1-2	1.113	0.944	1.312	0.202
3-4	0.964	0.812	1.145	0.676
>4	1			
Timing of first Antenatal visit				
First trimester	0.756	0.566	1.009	0.058
Second trimester	0.739	0.569	0.961	0.024*
Third trimester	1			

**Significant*

Tables 4 show the adjusted odds of missed opportunity for IPTp-SP for selected socio-demographic characteristics, location and pregnancy characteristics of respondent in Nigeria. Women whose highest levels of education were primary and secondary levels were approximately 1.4 times more at risk for missed opportunity for IPTp-SP than women who had tertiary level of education (OR= 1.402, CI (1.062-1.851), p=0.017; OR=1.344, CI (1.065-1.695), p=0.013, respectively. However, being of the poorer, middle and richer quintile confers an approximately 1.5 times less risk than those of the richest quintile for missed opportunity OR=0.737, p=0.024, CI (0.566-0.960); OR=0.659, p=0.001, CI (0.521-0.833); OR=0.686, p=0.001, CI (0.550-0.857). Muslims were 2.8 times less likely for missed opportunity when compared to women who are traditional worshippers OR=0.353, p=0.020, CI (0.147-0.845).

Another predictor of missed opportunity in Nigeria was region, where women resident in South East were 1.8 times less likely to have missed opportunity than women in the South West OR=0.549, p<0.001, CI (0.415-0.726), while women in the North Central and North East were twice less likely to report as a missed opportunity than women in the South West OR=0.324, p<0.001, CI (0.239-0.438) and OR=0.365, p<0.001, CI (0.281-0.475) respectively. Being resident in North West confers approximately 6 times less risk compared to South West OR=0.176, p<0.001, CI (0.133-0.232). Timing of first ANC visit in the second trimester confers a 1.4 times less risk for missed opportunity compared to women who presented in the third trimester OR=0.739, p=0.024, CI (0.569-0.961).

DISCUSSION

This study showed that approximately two thirds of the eligible respondents who had a minimum of (four) antenatal visits reported as a missed opportunity for IPTp-SP in Nigeria, which represents a significant proportion of missed opportunity. This was comparable to rates found in a study conducted in Uganda,[5] but much higher than rates reported in Niger, Senegal and in Malawi.[7] Anecdotal evidences show that the higher rates of missed opportunity for IPTp-SP observed in Nigeria could be attributed to the poorly-structured and poorly-financed health care system in the country. This may have resulted in a poorly integrated malaria programme with the reproductive health component of the national health care system where resources needed for the effective programme implementation are lacking.[13]

Analysis using the updated WHO 2012 policy recommendation of a minimum of three doses of SP in the preventive treatment of malaria in pregnancy in this study, reported majority of the respondents as missed opportunity. Approximately one third of women attending ≥4 ANC visits received either the first or second dose of IPTp-SP while two thirds received none at all. A possible reason for this could be shortage of the drugs at ANC facilities. As inadequacy in the supply arm has been cited as a possible explanation for low effectiveness of IPTp-SP delivery.[14] The observation in the current study shows that Nigeria has been unable to meet one of the targets of the Roll Back Malaria initiative, i.e. of achieving a 100% coverage for the intermittent preventive treatment of malaria in pregnancy by 2015.[15] This finding calls for increased efforts by the government to achieve this target. A possible strategy could be addressing observed cultural and socio-demographic barriers to uptake of IPTp-SP as well as providing the necessary logistics to optimize IPTp-SP within the gambit of ANC. Socio-demographic factors associated with missed opportunity in Nigeria, were level of education, wealth index and religion of respondents. This study showed that educated women were more at risk for missed opportunity compared to those with no education which was contrary to the study by Masaninga *et al.*, where increased uptake of IPTp-SP was associated with secondary education. This is likely because educated women are more likely to have a busier schedule because of work and thus do not fully maximize all the benefits of the ANC visit. There is need for health personnel to ensure they appropriately dispel any misconceptions about the drug Sulphadoxine pyrimethamine.

This study also showed that women within the richest quintile and those who are traditional worshippers are more likely to have missed opportunity compared to women of other quintiles and Muslim women respectively. This might have been caused by several factors which this study did not explore; hence a qualitative study would probably be able to provide a better explanation for this observation. Hence, awareness campaigns at sensitizing the community about the dangers of malaria in pregnancy as well as efficacy of SP should integrate strategies that will impact across educational and socio-economic sub-grouping.

Determinants of missed opportunities in this study showed type of place of residence is associated with prevalence of missed opportunity which is reportedly higher in the urban place of residence; this is in contrast with findings from the study of uptake of IPTp women in Zambia.[16] This might be due to the inequity of access which may be higher in the urban compared to the rural type of residence hence the increased chances for missed opportunity among clients. This

study also shows that region of residence is also associated with missed opportunity for IPTp-SP in similarity to other studies.[8,17] The higher odds of missed opportunity observed in the South-West may be due to over-concentration of non-governmental organizations to support governmental efforts in the programme planning and implementation in the Northern part of Nigeria compared to the Southern part. This may be due to perceived cultural and religious belief that hinder uptake of hospital based health interventions in the Northern regions. The ability to replicate successful programme planning and implementation to other regions, while allowing programme flexibility to adapt to local circumstance is a key way of ensuring successful malaria control interventions in Nigeria.

With regards to pregnancy characteristics, this study in similarity with others shows that parity and timing of first visit of ANC are determinants of missed opportunity[8,17,18,19] while this study's observation contrast with a study done in Ghana where timing of first visit of ANC was not associated with missed opportunity.[19] This study further showed that presenting in the second trimester reduced the risk of missed opportunity for IPTp-SP 1.4 times compared to women who presented for ANC visit for the first time in the third trimester. This may be due to the fact that early presentation for ANC optimizes the chances that pregnant mothers will take the standard doses of SP as per policy. This is even more important in the face of up-scaling national uptake of SP to the standard 3 doses or more as recommended by the updated WHO recommendation for the preventive treatment of malaria in pregnancy.[20]

CONCLUSION

Despite a decade post implementation of IPTp-SP, the abysmally low uptake evidenced by the magnitude of missed opportunity for this intervention necessitates a strategic approach to upscale the uptake of IPTp-SP in line with global agenda.[6] This can only be a reality with a stronger governmental commitment to strengthen national health systems as well as position them to optimally deliver integrated programmes that factor social, demographic and cultural barriers to uptake of IPTp-SP.

LIMITATION

A limitation in this study was the fact that it was a secondary data analysis, hence authors had no control on the variables investigated. Other factors such as knowledge of malaria in pregnancy and IPTp-Sp among respondents as well as supply side factors such as health worker knowledge and attitude, presence or absence of SP could not be assessed. It is important to state that this study was based on a nationally representative and large sample. It is believed that despite these limitations the study findings contributes significantly to existing knowledge and have strong policy impact.

Ethical approval and consent to participate

The study utilized a secondary data analysis of the Demographic Health Survey, the ethical approval and consent to participate is as described in the Nigerian Demographic Health Survey report of 2013.[20]

Consent for publication

Not applicable.

Availability of data and material

The data that support the findings of this study are available from the women individual recode dataset of Nigeria Demographic and Health Survey 2013[20] but restrictions apply to the availability of these data, which were used under license for the current study, and so are not publicly available. Data are however available from the authors upon reasonable request and with permission of Demographic and Health Survey (DHS) Program.

Competing interests

The authors declare they have no known competing interest.

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Authors' contributions

OO conceptualized and analyzed the findings and wrote up the manuscript. AO was OO's project mentor and was involved from the design to the writing of this manuscript.

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