

Coverage Rates And Missed Opportunities For Intermittent Preventive Treatment With Sulphadoxine-Pyrimethamine At Antenatal Clinics

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Background: Malaria in pregnancy has been associated with adverse outcomes for the mother, foetus and newborn, including maternal anaemia, low birth weight and neonatal mortality. Intermittent preventive treatment of malaria during pregnancy with sulphadoxine-pyrimethamine (IPTp-SP) is one of the key interventions recommended by the World Health Organization and adopted by many countries in malaria-endemic regions for the prevention and control of malaria in pregnancy. The WHO recommends that pregnant women receive sulphadoxine-pyrimethamine monthly during every antenatal care from the second trimester until delivery. This reviewed guideline by WHO was adopted by the Nigerian National Malaria Control Program in 2017.

Objectives: The study assessed coverage rates and missed opportunities for IPTp-SP administration at antenatal clinics (ANC).

Methods: This retrospective analysis was conducted over a month at the antenatal clinic units of two secondary hospitals in two different geopolitical zones of Nigeria. Obstetric data of all pregnant women were collected from the ANC registers of the two hospitals for all entries in 2013 that were up to 36 weeks of gestation and above.

Results: Data from 2134 pregnant women with gestational age up to 36 weeks were abstracted from the ANC registers of the two facilities. Within this population, the coverage rates of one-SP, two-SP and three-SP doses were 15.7% (335), 65.7% (1401) and 0.6% (13), respectively, while 18% (385) had no record of receiving any dose of SP. The percentage of pregnant women with up to four ANC visits was 72.9% (1546), while 8% (170) recorded their first ANC visit at a gestational age of > 36 weeks. The prevalence of missed opportunities for administration of at least 2-dose IPTp-SP among women with up to four ANC visits was 23.9% (370).

Conclusion: A moderate coverage rate of two-dose IPTp-SP was recorded, below the recommended target level of up to 100% rates in ANCs. There was also poor implementation of IPTp-SP intervention at the ANCs, leading to missed opportunities despite a substantial percentage of pregnant women that had up to the WHO-recommended four ANC visits before delivery.

Keywords: coverage rates, missed opportunities, IPTp-SP

Introduction

Malaria in pregnancy has been associated with adverse outcomes for the mother, foetus and newborn, including maternal anaemia, low birth weight and neonatal mortality.^[1,2] Intermittent preventive treatment of malaria during pregnancy with sulphadoxine-pyrimethamine (IPTp-SP) is one of the key interventions recommended by the World Health Organization and adopted by many countries in malaria-endemic regions for the prevention and control of malaria in pregnancy. The WHO recommends that pregnant women receive sulphadoxine-pyrimethamine monthly during every antenatal care visit from the second trimester until delivery.^[3] The reviewed guideline by WHO was adopted by the Nigerian National Malaria Control Program in 2017.^[4]

Despite the proven effectiveness of the IPTp-SP intervention, its coverage rates have lagged behind target rates throughout sub-Saharan Africa.^[5-7] National surveys in Nigeria use household survey

data and have consistently reported less than optimal coverage rates for intermittent preventive treatment in pregnancy with sulphadoxine-pyrimethamine (IPTp-SP). The most recent one, the Malaria Indicator Survey of 2015, reported a coverage rate of 37% for at least 2-dose IPTp-SP.^[8] Sub-optimal ANC attendance has been given as part of the reasons for the coverage gap.^[9] However, quantifying the missed opportunities to deliver IPTp-SP at ANCs will allow the effectiveness of healthcare delivery of IPTp-SP intervention to be assessed. Routine collection of health facility data through the Health Management Information System was started in Nigeria around 2012. These routine registers can serve as an alternative data source for estimating both coverage rates of IPTp-SP and missed opportunities for delivery at antenatal clinics (ANCs). This study assessed coverage rates and missed opportunities for IPTp-SP administration at ANCs.

Methods

This was a retrospective analysis conducted over one month. It included all available and legible one-year (2013) data from the ANC registers of two health facilities. The health facilities were Bishop Shanahan Hospital (BSH), Nsukka, a Mission hospital in south-eastern Nigeria, and General Hospital Calabar (BHC), a government-owned hospital in the south-south geopolitical zone of Nigeria. The number of doses of IPTp-SP given to pregnant women, number of ANC visit(s) and gestational ages were collected from the ANC registers for all entries in 2013 that were up to 36 weeks of gestation and above. Patients' hospital numbers were used to minimize duplication of data. The gestational age of 36 weeks was chosen because the National Guideline stipulates that SP should be given for up to 36 weeks of gestation.

Statistical analysis

Simple descriptive statistics were performed on the data to assess different SP coverage rates and missed opportunities. Chi-square was used to assess differences in categorical variables between the two health facilities, while an independent t-test was used for continuous variables. The statistical significance was set at p-value < 0.05.

Records of the number of IPTp-SP doses given to pregnant women were matched with a gestational age of up to 36 weeks from the antenatal registers to determine the coverage rates of IPT-SP in the hospitals. The missed opportunities were calculated as all entries up to 36 weeks of gestation with up to four ANC visits that did not receive at least two doses of IPTp-SP.

Ethical statement

The study was approved by the Ethical Review Committee of the University of Nigeria Teaching Hospital, Ituku-Ozalla, Enugu State, Nigeria.

Results

Data from a total of 2025 pregnant women - 1669 (82.4%) from the south-south hospital and 356 (17.6%) from the southeast hospital - with gestational age up to 36 weeks were abstracted from the ANC registers of the two facilities. Table 1 summarized the data obtained from the ANC registers at the two health facilities. The two facilities had similar data characteristics except for certain variables like gravidity ($p < 0.0001$), parity ($p < 0.0001$) and receipt of anti-retroviral therapy ($p = 0.010$). The general mean age of the women in the two facilities was 28.19 ± 11.65 . A more significant proportion of 1650 (82.0%) of the women had at least four ANC visits before 36 weeks of pregnancy, while only a small percentage (2.1%) were HIV positive.

Table 1: Antenatal Register Variables from the two Health Facilities

Variables	BSH	GHC	p	Total N (%)
Age (Mean \pm SD)	28.24 \pm 13.50	28.18 \pm 11.22	0.966	28.19 \pm 11.65

Gravidity (Mean ± SD)	2.65 ± 1.46	2.29 ± 1.38	< 0.0001*	2.36 ± 1.40
Parity (Mean ± SD)	1.65 ± 1.46	1.29 ± 1.37	< 0.0001*	1.25 ± 1.40
Average Number of Gestational Weeks (for women ≥ 36 weeks) (Mean ± SD)	37.88 ± 14.00	37.74 ± 9.68	0.406	37.76 ± 10.56
Average Number of ANC visits (for women ≥ 36 weeks) (Mean ± SD)	5.36 ± 2.31	5.69 ± 2.36	0.512	5.63 ± 2.36
Number of ANC Visits Groups				
≥ 4 ANC Visits	286 (80.3)	1364 (82.3)	0.403	1650 (82.0)
< 4 ANC Visits	70 (19.7)	293 (17.7)		363 (18.0)
1st ANC Visit at ≥ 36 weeks	9 (2.5)	59 (3.6)		68 (3.4)
HIV Counselling and Testing	353 (99.8)	1632 (97.8)	0.187	1985 (99.9)
HIV Positive	5 (1.4)	37 (2.2)	0.415	42 (2.1)
ARV Prophylaxis given	5 (1.4)	6 (0.4)	0.010*	11 (0.6)

BSH – Bishop Shanahan Hospital, GCH – General Hospital Calabar

The coverage rates of different IPTp-SP doses are represented in Table 2. The coverage rates were significantly different between the two facilities, with the facility in south-south, GCH, recording a higher coverage rate for at least two IPTp-SP doses than in southeast, BSH (74.7% vs. 59.8%). The coverage rates for one-, two- and three-dose IPTp-SP were 14.2%, 72.9% and 0.9%, respectively. According to the ANC Register records, the proportion of women who did not receive any SP dose at 36 weeks of gestation was 261 (12.9%).

Table 2: Coverage Rates of IPTp-SP Doses

Variables	BSH	GCH	p	N (%)
Zero SP Dose Given	66 (18.5)	195 (11.7)	0.001*	261 (12.9)
One SP Dose	70 (19.7)	217 (13.0)	0.002*	287 (14.2)
Two SP Doses	213 (59.8)	1246 (74.7)	< 0.0001*	1459 (72.9)
Three SP Doses	7 (2.0)	11 (0.7)	0.027*	18 (0.9)
At Least Two SP Doses	220 (61.8)	1257 (75.4)	< 0.0001*	1477 (73.0)

The percentage of missed opportunities was also significantly smaller in the south-south facility than in the southeast facility (21.4% vs 34.3%, $p < 0.0001$), Figure 1. The two facilities' overall prevalence of missed opportunities was 23.7%, as presented in Figure 1.

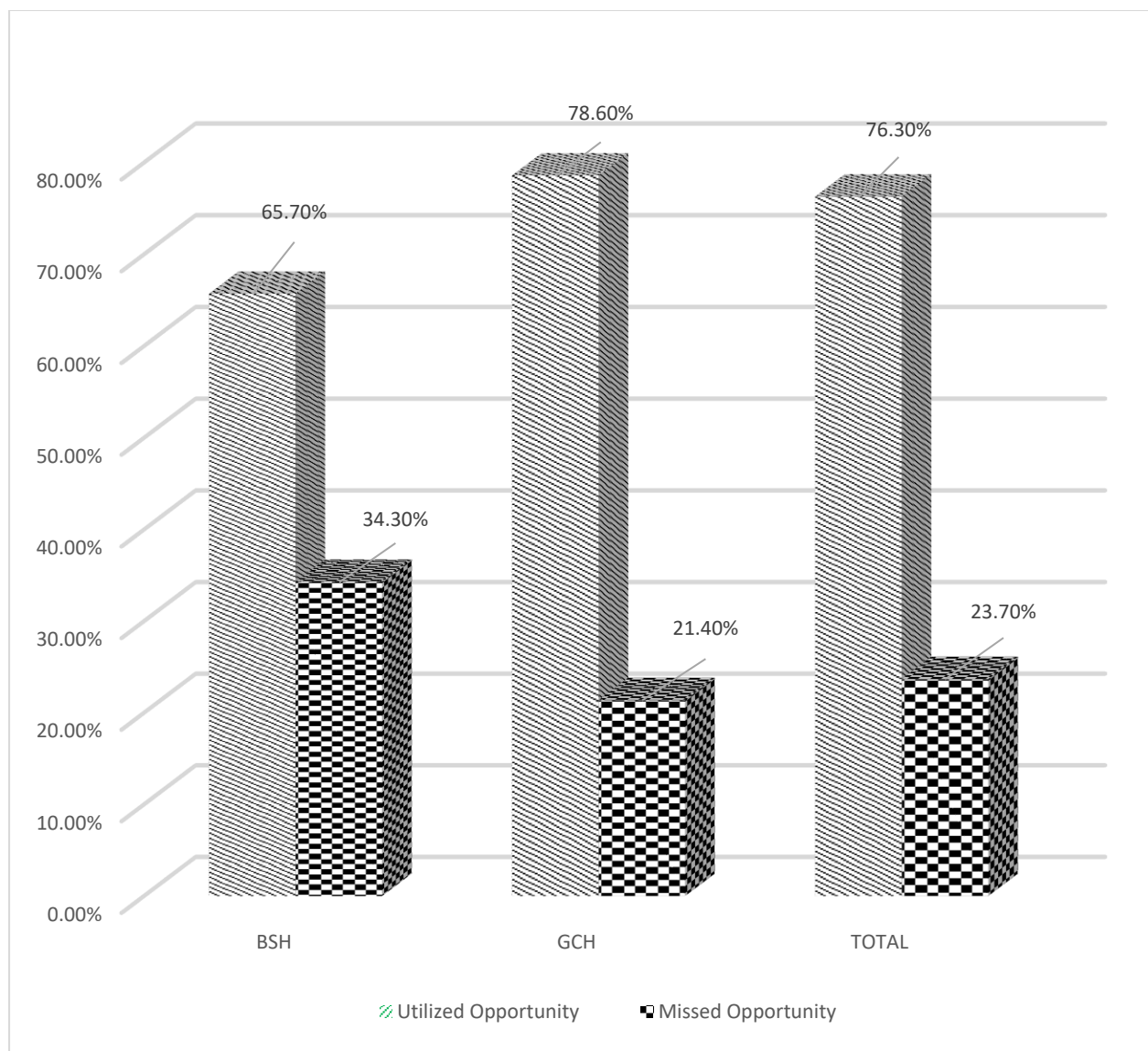


Figure 1: Prevalence of Missed and Utilized Opportunities for IPTp-SP Administration at the two facilities

Discussion

This study revealed moderate levels of coverage of at least 2-dose and 3-dose SP-IPTp at both facilities. Going by the coverage rates reported in the 2015 Demographic Health Survey ^[8], the level of coverage of 2-dose SP was an improvement over the coverage level of 37.2% for 2-dose SP, while the coverage of 3-dose SP was much lower than the 19% reported. However, the 2-SP dose coverage is still below the 2009-2013 Nigerian National Malaria Strategic Plan target ^[10] of up to 100% coverage rate in antenatal clinics.

Another laudable finding was the positive gap between the proportion of women who received at least two SP doses (73.0%) and those who received only one SP dose (14.2%). Previous reports around the time of this study (2013) from Nigeria's 2013 MIS ^[11] and even other African countries ^[12] had reported higher coverage rates for one-dose SP and disappointing second-dose SP coverage rates. Similarly, 26 of the 36 sub-Saharan African countries adopting IPTp-SP recorded that a median of 64% of pregnant women attending ANC received at least one dose of SP in 2012, 38% received at least two doses, and 23% received at least three doses. However, a sub-group analysis of 13 countries in the African Region for which household survey data were available for 2010-2012 revealed a decrease in

the negative gap between the coverage rates for two-dose and one-dose SP (37% for one-dose and 23% for two-dose) and an increase in three dose coverage to 8%.^[13] However, the recent MIS in Nigeria reported a similar positive gap (37.2% for at least 2-dose SP and 9.4% for one-dose SP).^[8] The coverage rate of 3-dose SP had increased from 5.8% in Nigeria's 2013 MIS^[11] to 19% in 2015 MIS.^[8] The two health facilities, GHC and BSH, are located in Cross River and Enugu States and had malaria prevalence of 26% and 11%, respectively, in 2015.^[8] The coverage rates of at least 3 or more SP doses in 2015 were 31% and 36% in Cross River and Enugu States, respectively. Coverage of 3-dose SP recorded in this study was 0.9%. This indicator is important to note, given Nigeria's adoption in 2017 of the new guidelines from WHO that stipulate the administration of IPTp-SP doses even up to delivery, thereby removing the upper limit to the number of doses of SP to be given during pregnancy.

Successful deployment of IPTp-SP depends on using ANC services amongst pregnant women. However, it has been reported that high ANC attendance does not translate to high IPTp coverage, and even higher IPTp-SP coverage than expected has been reported in settings with lower ANC attendance.^[14-16] A case in point is the data from the 2013 National Demographic and Health Survey^[11] in which only 22.6% received at least one dose as against the 72.6% that received ANC from a skilled provider in 2013.^[11] The timeliness of ANC visits is another critical factor and was alternatively assessed in this study by evaluating the number of women that had up to 4 ANC visits by 36 weeks of gestation as recommended by WHO. In this study, despite the fact that a reasonable percentage (72.9%) of the women met this criterion for effective IPTp-SP deployment, several opportunities were still missed at the facilities (23.9%). These missed opportunities indicated that the timeliness of women's ANC attendance was not the primary cause for the observed sub-optimal IPTp delivery. Consistent with other studies^[17-20], our findings indicated that health provider practices rather than the women's ANC attendance could primarily be responsible for the sub-optimal delivery of IPTp-SP strategy in these resource-limited settings.

A Nigerian study^[20] reported 87.6% and 96.0% missed opportunities to deliver the first and second SP doses, respectively, amongst women who had enough visits for the first and up to two doses of IPTp to have been administered. Their study estimated missed opportunities using 36 weeks of gestation as a cut-off point, after which IPTp-SP could not be administered. As was also used in our study, this cut-off point was initially recommended by the Nigerian National Guideline^[21]. However, it was revised in 2017 to match the current WHO recommendation of administering SP up to delivery.^[3] One of the facilities, the Southeast Hospital (BSH), further decreased the limit of SP uptake to 34 weeks of gestation. This might have contributed to the substantial disparity in the recorded proportion of women who received at least two doses between the two hospitals and may have also given rise to the almost doubling of the missed opportunities at the southeast (BSH) hospital compared to the south-south hospital (GHC). However, the overall percentage of missed opportunities recorded in the study was far lower than the 75% estimated globally.^[13]

Information on IPTp-SP delivery, until recently, has not been routinely collected from health facilities in Nigeria. Instead, reported coverage figures of malaria preventive interventions in Nigeria have been based on Demographic Health Surveys (DHS), Multiple Cluster Indicator Surveys (MCIS), Malaria Indicator Survey (MIS) (which was carried out in Nigeria for the first time in 2010) and other national surveys. Routine collection of health facility-level indicators through a harmonized Health Management Information System (HMIS) was started in Nigeria around 2012. The data used in our study analyses came from the antenatal register – one of such routine data registers provided by the national HMIS. Analyses of data from this register at the national level would provide a comprehensive and alternative picture of IPTp-SP deployment in the country, especially within the ANC framework, to that from national household surveys. When linked with regular supervision and feedback at the health facility, these routine systems would have dual benefits- informing on progress and serving as an incentive to health workers to improve their performance. Therefore, staff training on the need for such data collection and set-up of functional monitoring and evaluation systems is imperative.

It has been reported that the three countries that performed relatively well in terms of IPTp national coverage of two doses – Malawi (60.3%), Senegal (52.3%) and Zambia (60.3%) – had better accountability systems in terms of their monitoring and evaluation systems.^[22] The challenge with the HMIS routine data is to ensure that these indicators are collected rigorously and systematically through routine data monitoring systems. Nigeria has not fully optimized the potential of technology in setting up monitoring systems as data collection at the facility level still relies on hand-written registers, the

completion of which is time-consuming for the health workers and prone to errors. This coupled with missing data and low data quality (e.g., incomplete data, non-legible and torn pages) encountered during data entry served as major limitations and might have impacted the results.

Conclusion

The coverage of at least 2-dose IPTp-SP in antenatal clinics was below the Nigerian National Malaria Strategic Plan target. There was also poor implementation of both 2-dose and 3-dose SP for IPTp, leading to more missed opportunities for SP administration at the antenatal clinics.

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