



Review Article

Association of Antenatal Care Attendance with the Uptake of Intermittent Preventive Treatment Using Sulfadoxine-Pyrimethamine (IPT-SP) among Pregnant Women in Primary Health Centres in Orlu Zone, Imo State

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Abstract

Malaria in pregnancy is a major public health problem in sub-Saharan Africa. Intermittent preventive treatment with sulfadoxine-pyrimethamine (IPT-SP) is a major intervention for prevention of malaria in pregnancy and regular attendance of antenatal care (ANC) is necessary for optimal uptake of this intervention. To assess the relationship between prenatal care attendance and uptake of intermittent preventive therapy with sulfadoxine-pyrimethamine (IPT-SP) among pregnant women attending antenatal clinics in primary health centres in Orlu Zone of Imo State, Nigeria. A cross-sectional study was carried out among pregnant women attending prenatal clinics in several chosen primary health centres in Orlu Zone. Data on ANC attendance and IPT-SP uptake was obtained using a structured questionnaire and evaluated using descriptive and inferential statistics. The association between ANC attendance and IPT-SP uptake was examined and statistical significance was defined at $p < 0.05$. The uptake of IPT-SP rose with the number of prenatal care visits. The largest prevalence of IPT-SP was among women having four or more ANC visits with 115 (41.07%) women receiving IPT-SP. This was followed by women who attended ANC three times [85 (30.36%)], two times [49 (17.50%)] and one time [31 (11.07%)]. Results showed that the more ANC visits a pregnant woman had the more likely she was to take IPT-SP. This indicated that increasing contact with antenatal health care greatly improved compliance with prescribed malaria preventative treatment during pregnancy. Pregnant women attending regular prenatal care were substantially more likely to ingest IPT-SP. Enhancing initiatives to promote early booking and regular ANC attendance may improve adherence to IPT-SP recommendations and help to reduce the incidence of malaria in pregnancy.

Keywords: Antenatal Care, Attendance, Intermittent Preventive Sulfadoxine-Pyrimethamine, Pregnant Women Primary Health Centres, Orlu Zone.

INTRODUCTION

Malaria in pregnancy is a major public health problem, particularly in sub-Saharan Africa, where it is a significant contributor to maternal and newborn morbidity and mortality. Pregnant women are particularly vulnerable to malaria infection[1] due to physiological changes in immunity during pregnancy that enhance susceptibility to *Plasmodium falciparum*. Malaria in pregnancy may cause severe maternal anaemia, placental malaria, spontaneous miscarriage, preterm delivery, low birth weight, intrauterine growth retardation and increased perinatal and neonatal death. These negative effects are major impediments to the achievement of the Sustainable Development Goals on maternal and child health[2, 3].

The World Health Organization (WHO) recommends a comprehensive approach to the prevention of malaria during pregnancy in areas of moderate to high malaria transmission [4]. This strategy includes the use of long-lasting

insecticide-treated nets (LLINs), early diagnosis and effective treatment of malaria cases and intermittent preventive treatment in pregnancy with sulfadoxine-pyrimethamine (IPT-SP) [5]. The WHO advises administration of IPT-SP at each planned antenatal care (ANC) appointment starting in the second trimester if doses are given at least one month apart until birth [6]. This technique has been found to considerably reduce maternal malaria parasitaemia, placental malaria, maternal anaemia, low birth weight and newborn death [7]. Antenatal care is the primary platform in which pregnant women get IPT-SP. Regular attendance at ANC ensures timely administration of required doses and also provides the opportunity for health education, counselling, dietary assistance, illness screening and monitoring of pregnancy outcomes. Thus, timing and frequency of ANC attendance are critical factors of IPT-SP adoption. Women who start ANC early and attend the optimum number of visits are more likely to receive the optimal number of IPT-SP doses than women with late or irregular attendance[8]. Despite proven effectiveness of IPT-SP, uptake is suboptimal in many low- and middle-income countries including Nigeria. Several barriers have been identified such as late initiation of antenatal care, suboptimal ANC attendance, stock-outs of sulfadoxine-pyrimethamine, poor implementation of directly observed therapy, poor knowledge of pregnant women, long waiting times, healthcare worker practices and socioeconomic constraints. These problems hinder the efficiency of national malaria prevention initiatives and expose pregnant women and their newborns to preventable malaria-related complications [9]. Nigeria has one of the greatest malaria loads in the world, contributing a significant proportion of malaria cases and deaths. Despite ongoing national efforts to improve malaria prevention services, malaria burden among pregnant women remains high. Although national governments have adopted the WHO recommendation to deliver IPT-SP as part of regular antenatal care, adequate coverage remains a concern notably in rural communities and basic healthcare settings where access to excellent maternal health services may be limited[10]. Primary Health Centres (PHCs) are the first point of contact between the community and the health system and are crucial to the delivery of maternal and child health services, particularly malaria prophylaxis in pregnancy. Understanding the effect of ANC attendance on IPT-SP uptake within these facilities is important for designing interventions targeted at enhancing maternal health care utilisation and malaria prevention[11]. Earlier research have shown a relationship between ANC attendance and IPT-SP uptake in different parts of Nigeria, however there is scanty evidence from Orlu Zone of Imo State. Hence, this study attempted to establish the relationship between prenatal care attendance and uptake of intermittent preventive therapy utilising sulfadoxine-pyrimethamine (IPT-SP) among pregnant women attending antenatal clinics at Primary Health Centres in Orlu Zone, Imo State. The results of this study will inform policymakers, project managers and healthcare professionals on how to promote ANC utilisation and boost IPT-SP coverage, ultimately leading to improved maternal and newborn health outcomes in malaria-endemic populations.

MATERIALS AND METHODS

Study Design

This was a longitudinal observational study conducted among pregnant women attending antenatal clinics (ANC) in selected Primary Health Centres (PHCs) in Orlu Zone, Imo State, Nigeria. Eligible participants were enrolled during their antenatal visits and followed throughout pregnancy to assess the association between the frequency of antenatal care attendance and the uptake of intermittent preventive treatment with sulfadoxine-pyrimethamine (IPT-SP).

Study Area

The study was conducted in Orlu Zone, one of the three geopolitical zones in Imo State, southeastern Nigeria. The zone comprises twelve Local Government Areas (LGAs): Orlu, Orsu, Isu, Njaba, Nwangele, Nkwere, Oru East, Oru West, Ideato North, Ideato South, Oguta, and Ohaji/Egbema. There are approximately 72 Primary Health Centres across the zone, of which 33 were purposively selected for the study based on the availability of functional antenatal care services and IPT-SP implementation. The zone has an estimated population of about three million people, with primary healthcare facilities serving as the major providers of maternal and child health services.

Study Population

The study population comprised approximately 3,500 pregnant women who attended antenatal clinics at the selected 33 Primary Health Centres during the study period.

Sample Size Determination

The sample size was determined using Cochran's formula for finite populations:

The calculated minimum sample size was approximately 359 participants. To compensate for possible non-response and incomplete questionnaires, the sample size was increased to 400 pregnant women.

Sampling Technique

A purposive sampling technique was employed to select the participating Primary Health Centres based on the availability of routine antenatal care services and IPT-SP administration. Within each selected health facility, eligible pregnant women who met the inclusion criteria and provided informed consent were consecutively recruited until the required sample size was achieved.

Ethical Considerations

Ethical approval for the study was obtained from the Ministry of Health Ethics Committee Owerri before commencement of the study. Permission was also obtained from the management of the participating Primary Health Centres. Informed consent was obtained from all participants after explaining the objectives, benefits, and procedures of the study. Participation was voluntary, confidentiality was maintained throughout the study, and participants were assured of their right to withdraw from the study at any time without any consequences to their routine medical care.

Data Collection Instrument

Data were collected using a researcher-designed, semi-structured questionnaire. The instrument was developed after reviewing relevant literature and consisted of sections covering:

- Antenatal care attendance
- Uptake of intermittent preventive treatment with sulfadoxine-pyrimethamine (IPT-SP)
- Number of ANC visits
- Number of IPT-SP doses received
- Reasons for missed or refused IPT-SP doses

Participants were followed from their first antenatal visit until approximately 38 weeks of gestation, and relevant information was updated at each subsequent ANC visit.

Validity of the Instrument

Face and content validity of the questionnaire were established through expert review by supervisors and specialists in public health and maternal health research. Necessary corrections and modifications were incorporated based on their recommendations. A pilot study was conducted among pregnant women attending a Primary Health Centre outside the study area to ensure clarity, relevance, and appropriateness of the questionnaire.

Reliability of the Instrument

The reliability of the questionnaire was assessed through pretesting during the pilot study. Ambiguous questions were revised to improve consistency and comprehension. The instrument was organized into clearly defined sections corresponding to the study objectives to ensure reliable data collection.

Data Collection Procedure

Research assistants comprising doctors, nurses, midwives, community health extension workers, and trained students were recruited and trained on the objectives of the study, ethical considerations, questionnaire administration, and data collection procedures.

Permission to conduct the study was obtained from the heads of the selected Primary Health Centres. Eligible pregnant women attending antenatal clinics were informed about the purpose of the study, and written informed consent was obtained before enrolment.

Baseline information was collected during the participants' first antenatal visit. At each subsequent ANC visit, information regarding ANC attendance and IPT-SP uptake was documented. Participants were followed until approximately 38 weeks of gestation, after which the completed questionnaires were retrieved for data entry and analysis.

Inclusion Criteria

Participants eligible for inclusion were:

- Pregnant women attending antenatal clinics at the selected Primary Health Centres.
- Pregnant women in the second or third trimester of pregnancy.
- Women eligible to receive IPT-SP according to national malaria prevention guidelines.
- Women who voluntarily provided written informed consent.

Exclusion Criteria

The following women were excluded from the study:

- Pregnant women who declined to participate.
- Women attending antenatal care outside the selected Primary Health Centres.
- Women with documented hypersensitivity to sulfonamides or sulfadoxine-pyrimethamine.
- Women in the first trimester of pregnancy.

Data Analysis

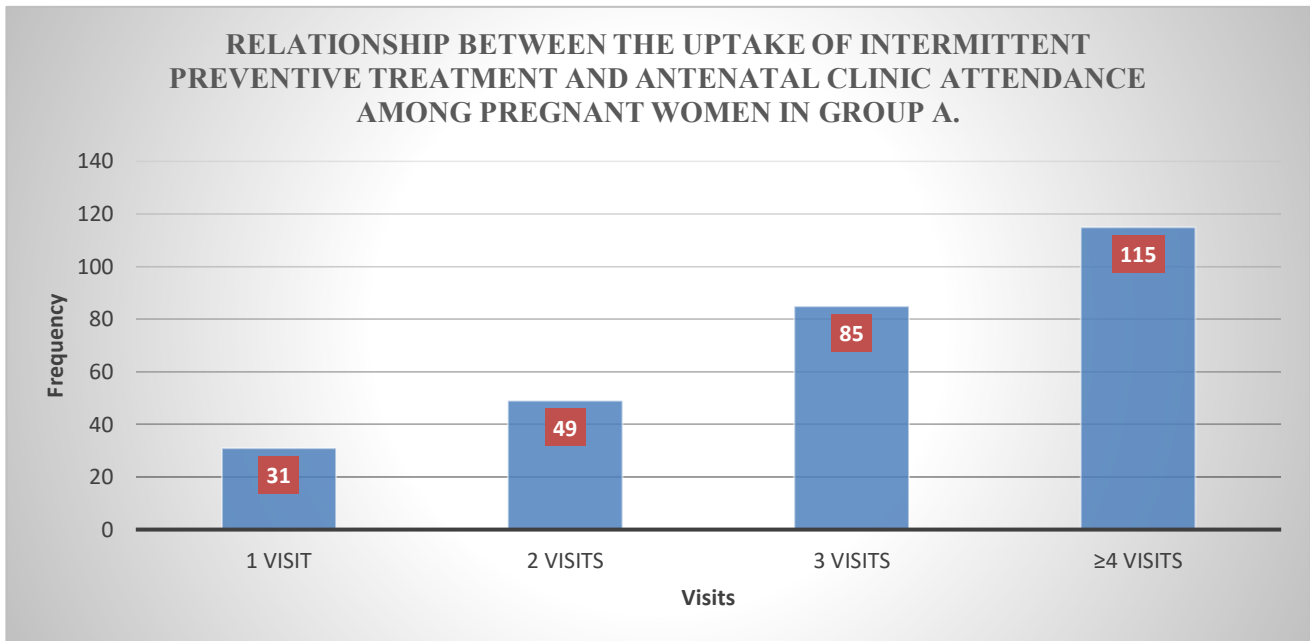
Completed questionnaires were checked for completeness and entered into the Statistical Package for Social Sciences (SPSS) version 25.0 for analysis.

Descriptive statistics were used to summarize the data and were presented as frequencies, percentages, tables, and charts. The association between antenatal care attendance and IPT-SP uptake was assessed using the Chi-square test. Statistical significance was set at $p < 0.05$.

RESULTS

Table 1: Antenatal Clinic (ANC) Attendance among Pregnant Women in Primary Health Centres in Orlu Zone, Imo State

No of attendance	1	2	3	4 or more
No of women	31	49	85	115
Percentage uptake %	11.07	17.50	30.36	41.07



From table 1, the highest number of participants that took the intermittent preventive treatment was 115 (41.07%), and these were women that attended antenatal clinic 4 or more times. This was followed by those participants that attended antenatal clinic three times, and their number was 85 (30.39%). The number of participants that attended antenatal clinic twice and took the drug was 49 (17.50%). The lowest number of participants that took the drug was 31 (11.07%), and these participants attended antenatal clinic only once.

There is a strong positive relationship/correlation between ANC attendance and IPT-SP uptake. Increased contact with health services improves compliance.

Discussion

This study was conducted to establish the relationship between antenatal care (ANC) attendance and the uptake of intermittent preventive therapy with sulfadoxine-pyrimethamine (IPT-SP) among pregnant women attending Primary Health Centres in Orlu Zone, Imo State. Results indicated a clear positive correlation between number of ANC visits and IPT-SP uptake. The highest uptake of IPT-SP was among the women who attended antenatal clinics four or more times (41.07%) and the lowest uptake was among those who attended once (11.07%). These data imply that greater interactions with health practitioners throughout pregnancy considerably improves adherence to the World Health Organization (WHO) recommendation for IPT-SP treatment.

The observed increase in IPT-SP uptake with higher ANC attendance is predicted as IPT-SP is routinely provided during scheduled prenatal visits under directly observed treatment (DOT). Frequent attendance at ANC offers women more opportunities to obtain the necessary dose of sulfadoxine-pyrimethamine, health education on malaria prevention and ongoing monitoring by healthcare staff. On the contrary, women who initiate ANC late or attend few visits may have lower opportunity to receive the required dosages before birth. This data supports the centrality of ANC services as the main delivery platform for malaria prevention measures in pregnancy [12, 13].

The results of this study are in line with that of the World Health Organization which states that IPT-SP should be administered at each scheduled ANC visit starting from the second trimester until delivery, provided doses are given at

least a month apart and antenatal care is started early. Hence frequent attendance of ANC gives adequate opportunity for pregnant women to obtain the recommended number of IPT-SP doses thereby minimising the risk of maternal malaria, placental malaria, maternal anaemia, low birth weight and unfavourable neonatal outcomes [14].

The present findings are in line with earlier research in Nigeria and other malaria-endemic countries which consistently revealed that regular attendance at prenatal clinics is one of the strongest predictors of optimal uptake of IPT-SP[15, 16]. Several investigators have found that women attending four or more ANC visits are significantly more likely to receive at least three doses of IPT-SP than women attending fewer visits. Similar results have been reported in Ghana, Kenya, Tanzania, Uganda and other sub-Saharan African countries where ANC attendance has been regularly reported as a major driver of compliance to malaria preventative therapy throughout pregnancy. Such similarities have revealed that improving ANC utilisation is still one of the best strategies to increase IPT-SP coverage in malaria endemic areas[17]. The continuous increase in IPT-SP use across successive ANC visits also shows the importance of routine prenatal services in promotion of maternal health. In addition to providing IPT-SP, recurrent ANC visits give opportunity for malaria prevention advice, provision of insecticide-treated nets, nutritional education, screening for pregnancy-related problems and reinforcement of adherence to national malaria control guidelines[18]. Therefore women who regularly visit ANC are exposed to several preventative measures with improved maternal and foetal outcome[19]. The low uptake of IPT-SP among women who only attended ANC once is a worry. The low attendance at ANC clinics limits the opportunity for health care providers to provide IPT-SP and educate pregnant women on the importance of malaria prevention [20]. Late ANC scheduling may also be a reflection of low awareness of antenatal services, financial restrictions, significant travel distances to health facilities, cultural attitudes, competing family obligations or limited access to healthcare services. Enhancement of community education, provision of increased access to antenatal services and development of primary health care systems may significantly contribute to increased use of IPT-SP[21]. The findings have substantial implications for public health in the control of malaria in Nigeria. ANC attendance, especially early booking and completion of the appropriate number of prenatal visits is expected to improve uptake of IPT-SP and minimise the incidence of malaria in pregnancy. To optimise the impact of malaria control efforts, health education campaigns, community mobilisation, continuous availability of sulfadoxine-pyrimethamine at health facilities and adherence by health professionals to directly observed therapy should be reinforced[22].

This study provides valuable evidence on the association between ANC attendance and IPT-SP uptake, but some limitations should be acknowledged. The study was carried out among pregnant women attending selected Primary Health Centres in Orlu Zone, therefore, the findings may not be generalisable to women seeking care in secondary or tertiary health institutions or in other regions of Nigeria. In addition, data acquired through questionnaires may have been subject to recall bias[23]. Other factors that may influence IPT-SP uptake such as health professional behaviours, availability of drugs, mother awareness, socio-economic and cultural beliefs were also not examined in detail. Future multicentre studies with multivariable analyses are required to assess the independent influence of these factors to IPT-SP utilization[24].

Conclusion

The outcomes of this study indicate that attendance of prenatal care is an important factor of IPT-SP uptake among pregnant women. Policymakers, healthcare providers and malaria control programmes should continue to encourage early ANC booking and consistent attendance during pregnancy. Enhancing antenatal care services at the primary healthcare level may considerably improve IPT-SP coverage and help reduce malaria-associated maternal and neonatal morbidity and mortality in malaria-endemic communities.

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