

Impact of malaria prophylaxis on *Plasmodium Parasitemia* among pregnant women receiving care at Federal Medical Centre, Owerri

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Abstract

Background: Malaria during pregnancy harms the baby's health. As personal protection and chemoprevention therapy, insecticide-treated nets (ITN) and intermittent preventive treatment (IPTps) of malaria during pregnancy are recommended. According to the World Health Organization, the introduction of IPTp and ITN constituted a defining moment in malaria prevention in endemic areas during pregnancy. The purpose of this research was to see if there was an association between the usage of IPTp and ITNs and maternal malaria prophylaxis.

Methods: A cross-sectional study was conducted on 327 pregnant women who presented at the federal medical center in Owerri. Participants' blood samples were taken for microscopic inspection to detect malaria parasites using established procedures. Pregnant women provided information on their use of IPTp and ITN. Descriptive statistics were used to characterize the independent variables, and chi-square was used for categorical variables as needed using Microsoft Excel 2016.

Results: There was a significant association between IPTp use in the prevention of malaria in pregnancy (P-Value = <0.001) and ITN use in the prevention of malaria in pregnancy respectively (P-Value = <0.001).

Conclusions: Maternal Malaria is a major public health issue that poses severe danger to pregnant women and their fetuses. IPTp and ITN use are beneficial in malaria prevention among this population.

Keywords: ITN; IPTp; Malaria; Maternal; Owerri

1. Introduction

Malaria during pregnancy is a major public health issue that poses severe dangers to the pregnant mother, her fetus, and the newborn child [1]. Each year, an estimated 125 million pregnant women worldwide are at risk of malaria infection, with 30 million from Sub-Saharan Africa [2]. Furthermore, it is predicted that 75,000–200,000 children and 10,000 women die each year as a result of malaria in pregnancy [2,3]. In Nigeria, as in many other endemic regions in Africa, pregnant women and children under the age of five face the brunt of the malaria burden. Malaria is thought to cause 3-5% maternal anemia, 8-14 % low birth weight (LBW), and 3-8% infant mortality during pregnancy. [4]. Particularly, *Plasmodium falciparum* infections in pregnancy contribute to approximately 11% (100, 000) of neonatal deaths due to low birth weight in areas of Africa where malaria is endemic [3,5,6].

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World Health Organisation promotes malaria prevention techniques during pregnancy in malaria-free areas in Africa, where roughly 25 million pregnancies are infected each year [7]. These interventions are based on the use of insecticide-treated nets (ITNs) and the administration of intermittent preventative treatment (IPTp) [7].

IPTp entails giving a woman a single curative dose of an effective anti-malarial drug at least twice during her pregnancy, regardless of whether she is infected or not. During antenatal visits, the medication is given under supervision. Because of its safety and efficacy in pregnancy, the WHO currently recommends sulphadoxine-pyrimethamine and personal protection methods that prevent man from coming into touch with mosquitoes are known as ITNs [7, 8]. In high-transmission areas, the introduction of IPTp and ITN marked a watershed moment in malaria prevention during pregnancy [7]. The goal of this study was to look at the links between IPTp and ITN use and malaria prevention in pregnant women receiving antenatal care at Federal Medical Centre, Owerri.

2. Material and methods

2.1. Study Design

The cross-sectional study was conducted in the obstetrics units at Federal Medical Center (FMC).

2.2. Study Population

Pregnant women who attend the antenatal clinic of the Federal Medical Center (FMC) in Owerri make up the research population.

2.3. Sampling and Sample Size for the study

The sample size for proportions formula was used to calculate a sample size of 327 using a 29% prevalence of maternal malaria(9) as shown below: $n = z^2pq/d^2$ where n = minimum sample size, z = confidence interval of 95 percent which is equivalent to the coefficient of 1.96, p = proportion/prevalence of the previous study, q = alternate proportion (1- p), d = level of precision set at 5% To choose the participants, a stratified sampling procedure was used.

Blood samples were taken from the subjects for microscopic analysis to detect malaria parasites, as described by Satio et al [10]. Within one hour following childbirth, placental blood was taken by incising the placenta's cleansed maternal surface (basal plate). [10]. The samples' thin and thick blood films were transferred to grease-free glass slides and stained for malaria parasite identification using established procedures [11].

2.4. Data Collection

The study participants were asked to fill out a structured PROFORMA data collecting sheet with demographic information, ITN use, IPTp use, and malaria diagnoses.

2.5. Data analyses

Statistical Package for Social Sciences (SPSS) version 25 was employed for the statistical analysis. Descriptive statistics (means, standard deviation, frequency, and percentage) were used to summarize the patients' characteristics. Chi-square was used to assess the association between IPTp and ITN use and the occurrence of maternal malaria. A p -value less than 0.05 was considered significant.

2.6. Ethical Consideration

Ethical approval to carry out the study was obtained from the Research and Ethics Committees of the Federal Medical Center Owerri before the commencement of the study. A written willing informed consent was obtained from each participant before they were included in the study.

3. Results and discussion

A total of 327 patients were included in the study. Table 1 shows the distribution of the socio-demographic characteristics of the participants including age, education, and occupation. The mean age of study participants was 30.68 ± 5.71 years. Some of the study patients 181 (55.35%) were between 30 – 39 years old and was closely followed by those between 18 – 29 years 130 (39.76%). Some 151 (46.18%) respondents were self-employed. Some 173 (52.91%) of the patients had achieved tertiary education. Table 2 shows there was no significant association between gravidity and malaria in pregnancy. There was a significant association between intermittent preventive therapy in the

prevention of malaria in pregnancy (P-Value = <0.001) and there was a significant association between the use of insecticide-treated net and malaria in pregnancy (P-Value = <0.001) as shown in tables 3 and 4.

Table 1 Demographic Distribution of Patients

| Variable | Frequency (n = 327) | Percent (%) |
|--------------------------|---------------------|-------------|
| Age Groups | | |
| 18 – 29 years | 130 | 39.76 |
| 30 – 39 years | 181 | 55.35 |
| 40 – 49 years | 16 | 4.89 |
| Occupation | | |
| Self Employed | 151 | 46.18 |
| Civil Servants | 114 | 34.86 |
| Housewife | 1 | 0.31 |
| Unemployed | 61 | 18.65 |
| Educational Level | | |
| Primary | 63 | 19.27 |
| Secondary | 80 | 24.46 |
| Tertiary | 173 | 52.91 |
| No Formal Education | 11 | 3.36 |

Table 2 Relationship between Gravidity and Malaria in Pregnancy

| Gravidity | Positive | Negative | Chi-Square | P-value |
|-----------|------------|------------|------------|-------------|
| Gravida 1 | 26 (21.14) | 43 (21.29) | 0.01 | (0.9745)** |
| Gravida 2 | 63 (51.22) | 99 (49.01) | 0.14 | (0.6992)** |
| Gravida 3 | 29 (23.58) | 48 (23.76) | 0.01 | (0.9693)** |
| Gravida 4 | 5 (4.07) | 10 (4.95) | 0.13 | (0.7121)** |
| Gravida 5 | 0 (0.00) | 2 (0.99) | 1.22 | (0.5280)f** |

Table 3 Malaria in Pregnancy and Use of IPT

| Malaria in Pregnancy | IPT USE | | Chi-Square P-value |
|----------------------|-------------|------------|--------------------|
| | Yes | No | |
| Positive | 80 (29.09) | 45 (86.54) | 61.11 0.0001* |
| Negative | 195 (70.91) | 7 (13.46) | |

4. Discussion

Malaria morbidity and death have been demonstrated to be reduced when ITNs are used alone [12]. The Roll Back Malaria (RBM) alliance, on the other hand, advocates using intermittent preventative treatment (IPT) also in areas where malaria transmission is steady to reduce the disease's burden among pregnant women [13,14]. In many malaria-

endemic regions of Sub-Saharan Africa, the execution of the IPTp policy has been plagued by periodic shortages of the program medicine, denying pregnant women on prenatal consultations access to the treatment [15,16]. This may be attributed to some women who tend to be consistent with their visits to the antenatal clinic. Our research found a link between IPTp, ITN use, and malaria prophylaxis in pregnancy among pregnant women attending the Federal Medical Center (FMC) at Owerri's antenatal clinic. It was discovered that pregnant women who used IPTp and ITN had a reduced rate of maternal malaria than those who did not. Our findings are consistent with those of an earlier study that found a link between IPTp and ITN use and maternal mortality, However, the study also found that ITN alone did not provide complete protection [17]. Nonetheless, our analysis had a flaw: it did not reveal the direction or magnitude of the relationship between various preventive interventions and maternal mortality. Consequently, more robust study designs are recommended in further studies in Nigeria.

5. Conclusion

Maternal Malaria is a major public health issue that poses severe danger to pregnant women and their fetuses. IPTp and ITN use are beneficial in malaria prevention among this population.

Compliance with ethical standards

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Disclosure of conflict of interest

There was no conflict of interest.

Statement of informed consent

Informed consent was obtained from all individual participants included in the study.

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