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Determinants of Intermittent Preventive Malaria Therapy Among Pregnant Women in A Nigerian Teaching Hospital

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ABSTRACT

Background: Intermittent Preventive Treatment of malaria in Pregnancy (IPTp) is mostly issued in most antenatal clinics across the country but there have been reports of poor utilization of this prophylaxis.

Objective: This study assessed the determinants of IPTp among pregnant women attending a tertiary hospital in southeast Nigeria.

Methods: The study was a descriptive cross-sectional study in which a self-administered questionnaire was distributed to 250 pregnant women receiving antenatal care in the study hospital. The data collected were analyzed with the aid of SPSS, using descriptive and inferential statistics. A p-value of less than 0.05 was considered significant.

Results: A majority of the participants responded positively to most of the factors assessed, however, none was statistically significant.

Conclusion: Based on these findings, pregnant women at a tertiary hospital in southeast Nigeria are aware of IPTp, nevertheless, most fail to commence the medication at the correct time.

Keywords

Malaria, Pregnant women, Antenatal care, IPT.

Abbreviations

IPT: Intermittent prevention and treatment; SP: Sulphaodxine and Pyrimethamine; ANC: Antenatal Clinics; WHO: World Health Organization.

Introduction

Globally, significant progress has been made in the universal fight against malaria, yet, there are 3.4 billion people, including pregnant women who are still at risk of contracting malaria each year [1,2], this is because malaria is still endemic in continents like Asia and Africa [3-5], in as much that malaria in pregnancy (MiP) is one of the avertible causes of maternal death and poor birth outcome during pregnancy [6-8]. Malaria infection has been reported to have adverse effects on both mother and fetus [6,7,9], it is also one of the main causes of anemia in pregnancy which can result in fetal loss, premature delivery, and it is a secondary cause of intrauterine growth retardation and delivery of low birth-weight infants [4,6,9]. Malaria attacks in Nigeria accounted for the highest percentage of maternal and childbirth complications in the world, and most malaria-related cases resulted in the death of both mother and/or child [1,2,10].

The World Health Organization (WHO) has recommended different approaches for malaria prevention and treatment in pregnancy, including the use of sulfadoxine-pyrimethamine for intermittent prevention of malaria in pregnancy (IPTp-SP), insecticide-treated bed nets (ITNs) [6], and effective case management of malarial illness, and so far, IPTp-SP has proven to be most effective and cost-effective method with a positive economic and humanistic outcome [11]. The use of IPTp-SP in the prevention of malaria in pregnancy involves the use of sulfadoxine-pyrimethamine on pregnant women without confirmation of malaria and it also involves directly observing the administration of a curative dose of sulfadoxine-pyrimethamine at every routine antenatal care visit, starting as early as possible in the second trimester [9].

In Nigeria, most pregnant women attend some form of antenatal care (ANC service) or other services before they are eventually put to bed [5,12]. This provides the best chance for direct observation of women taking the medication. Nonetheless, there have been reports from studies that showed inadequacies in the administration of the IPTp-SP in some antenatal clinics in Nigeria [5,12-14] due to stock shortages, lack of awareness, side effects, late registration for antenatal visits, etc. This study is aimed to consolidate some of these findings by assessing the determinants of intermittent preventive malaria therapy among pregnant women at the Nnamdi Azikiwe University Teaching Hospital in Nnewi, Anambra State,

Nigeria, and identify areas for possible improvement.

Methods

Study design

It was a cross-sectional descriptive study that utilized a well-structured adapted questionnaire to assess the determinants of intermittent preventive therapy during pregnancy.

Study setting

The study was carried out on pregnant women receiving antenatal care at Nnamdi Azikiwe University Teaching Hospital (NAUTH) in Anambra state. The Nnamdi Azikiwe University Teaching Hospital (NAUTH) is in the south-eastern region of Nigeria. The hospital was established in the year 1991 by the Federal government of Nigeria [15]. It was formerly known as the Anambra State University of Technology Hospital [15]. It has a catchment population of about 30,994,559 with a functional accident and emergency unit that provides 24-hour emergency service all year round [15,16].

Inclusion criteria

All pregnant women who visited NAUTH for their regular antenatal care were available at the time of data collection and those who consented to the study. The study excluded pregnant women who came for antenatal care but were critically ill and hospitalized.

Sample size determination

The sample size was determined using Cochran's formula for calculating large populations;

$n_0 = Z^2pq \div e^2$, where:

n_0 = sample size

Z^2 (desired level of confidence) = 95%: 1.96

p (estimated proportion of attributes present in the population) = 0.25: 25%

$q = 1-p$

e (desired level of precision) = 5%: 0.05

$n_0 = (1.96)^2 \times 0.25 (1-0.5) \div (0.05)^2$

$n_0 = 3.8416 \times 0.125 \div 0.0025 = 0.4802 \div 0.0025 = 192.08 \sim 193$

- Using an estimated attrition rate of 29%;
- 29% of 193 = ~ 56
- 56 + 193 = 249 participants + 1 = 250 participants

Hence, the number was adjusted to two hundred and fifty (250) to accommodate incompletely filled questionnaires and compensate for attrition. In addition, one participant was added to obtain a round figure.

Study Period

This study spanned a period of five months, from April 2021 to September 2021.

Study Instrument

Questionnaire

The questionnaire was adapted from a similar study carried out in a primary health center in Oyo, state, Nigeria by Adewole *et al.* 2004 [14]. The questionnaire comprised of a section on demographic characteristics and three domains namely, factors associated with access to healthcare facilities, uptake of IPTSp, and healthcare provider factors associated with uptake of IPT-Sp.

The first part contained 11-item survey questions on demographics such as age, marital status, education, occupation, socio-economic status, first pregnancy, and several pregnancies, delivery history, at what week did prophylaxis commence, gestational age of registration for antenatal care, knowledge of insecticide-treated bed nets, and sources of information about malaria prevention in pregnancy. The second part of the questionnaire focused on questions that addressed access to healthcare facilities and uptake of IPTP.

The third section of the questionnaire asked open-ended questions to assess the healthcare provider's contribution to IPTP-Sp uptake.

Pretesting of questionnaire/Pilot testing

The questionnaire was pre-tested using 10% of the sample size, among pregnant women attending antenatal in a hospital different from the selected hospital for the survey in the same state. Face validation was carried out to verify that the questions contained in the questionnaire were appropriate and that the questionnaire was ready for use. Face validation was carried out by four health care professionals comprising two physicians in the antenatal care unit and two lecturers in the clinical pharmacy department of clinical pharmacy at Nnamdi Azikiwe University, Awka.

Questionnaire administration and collection

A validated self-administered questionnaire was used to collect data from the respondents after receiving their consent. A total of 250 questionnaires were administered over a period of two months.

Table 1: Socio-Demographic Characteristics of Respondents.

Variables	Occupation of Respondents (n)		Total (n%)	P-value
	HOUSEWIFE (N)	EMPLOYED (N)		
Marital status				
Single	20	26	46 (23.0)	
Married	35	114	149 (74.5)	
Divorced	0	5	5 (2.5)	
Age (in years)				
15-24	15	49	64 (32.0)	
25-34	35	81	116 (58.0)	
35-39	5	15	20 (10.0)	
Mean age = 27.1 years, (Standard deviation = ± 5.64 years)				
Week commenced prophylaxis				
12-14weeks	15	22	37 (18.5)	
15-17weeks	15	56	71 (35.5)	
18-20weeks	25	67	92 (46.0)	0.061
Mean week of commencement of prophylaxis = 17.99, (Standard deviation = ± 6.38 weeks)				
Education				
No formal education	0	5	5 (2.5)	
Primary	5	10	15 (7.5)	
Secondary	20	35	55 (27.5)	
Tertiary	30	95	125 (62.5)	
Social-economic status (woman's income per month)				
Lowest	5	10	15 (7.5)	
Middle low	15	20	35 (17.5)	
Middle	20	46	66 (33.0)	
Middle High	15	31	46 (23.0)	
Highest	0	38	38 (19.0)	19.672
Delivery History				
<4	35	103	138 (69.0)	
>4	20	42	62(31.0)	1.020
Gestational age at registration of ANC				
First trimester	35	89	124(62.0)	
Second trimester	10	51	61(30.5)	
Third trimester	10	5	15 (7.5)	15.348
Knowledge of insecticide-treated bed net				
Yes	5	26	31 (15.5)	
No	50	119	169(84.5)	23.379
Total	55	145	200	

Table 2: Factors associated with the access to healthcare facilities and uptake of IPTp-SP.

Variables	Occupation of Respondents (n)		Total (n%)	P-value
	HOUSEWIFE (n)	EMPLOYED(n)		
Access to healthcare facilities is hindered by geographical barriers				
Yes	15	47	62(31.0)	
No	40	98	138(69.0)	0.493
Type of nearest health facility				
Dispensary	20	80	100(50.0)	
Others	35	65	100(50.0)	5.653
The time it takes to walk to the nearest health facility				
>1hr	30	55	85(42.5)	
<1hr	25	90	115(57.5)	4.504
Does distance affect clinical attendance				
Yes	20	42	62(31.0)	
No	35	103	138(69.0)	1.020
The nearest health facility is open every day				
Yes	45	114	159(79.5)	
No	10	31	41(20.5)	0.250

Table 3: Health care provider’s factor associated with uptake of IPTp-SP (N = 200).

Variables	Occupation of Respondents (n)		Total(n%)	P-value
	HOUSEWIFE (n)	EMPLOYED(n)		
Health education on pregnancy provided to you by the health provider during the ANC visit is clear and concise				
Yes	50	135	185(92.5)	
No	5	10	15(7.5)	0.277
The staff is ready to answer your concern				
Yes	45	128	173(86.5)	
No	10	27	27(13.5)	1.424
Given return dates by the health provider during your visit				
Yes	55	135	190(95.0)	
No	0	10	10(5.0)	3.993

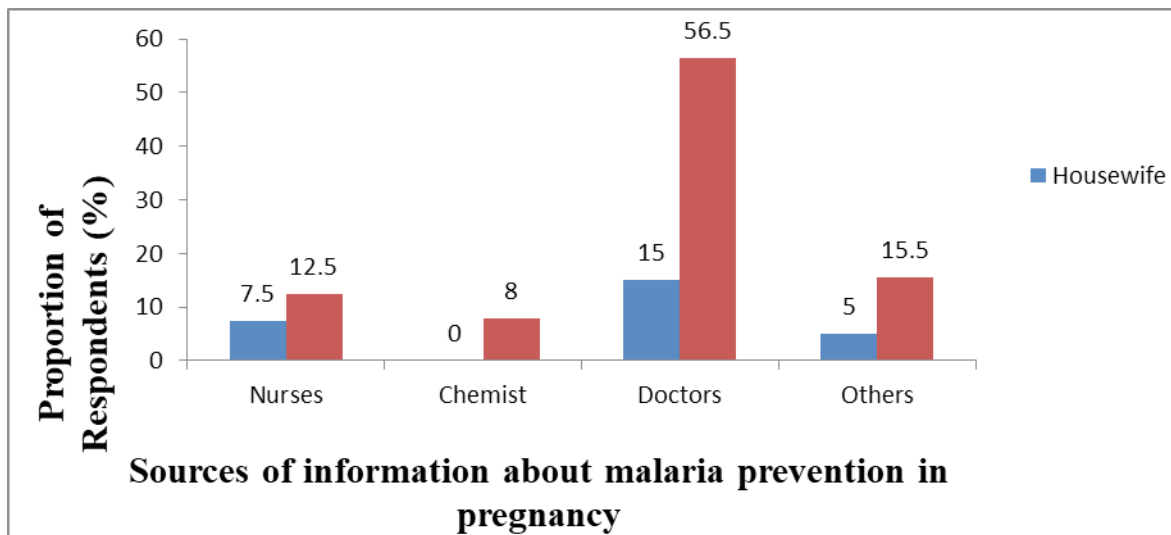


Figure 1: Sources of information about malaria prevention in pregnancy.

Statistical analysis

The retrieved copies of the questionnaires were collected and classified into domains. Results gotten from this study were entered into the Microsoft Excel database, which was then exported into the Statistical Package for Social Sciences (SPSS) version 23. Demographic variables were reported as percentages. Analysis was

carried out appropriately. Differences were considered statistically significant at an alpha level of 0.05 ($p < 0.05$).

Ethical considerations

Ethical approval for the study was obtained from the Ethics Committee of Nnamdi Azikiwe University Teaching Hospital

(NAUTH) on the 24th of July 2019 with an approval number NAUTH/CS/668/VOL.2/066. Study site permission was obtained before the commencement of the study. The respondents were informed of their choice to refuse or agree to participate in the study. To ensure confidentiality, participants were not asked to identify themselves by name, phone number, or any other identifier linked to the participants. Efforts were made to ensure that no participant filled the questionnaire twice.

Results

Socio-demographic Characteristics of the Respondents

Of the 250 questionnaire instrument distributed to pregnant women at Nnamdi Azikiwe University Teaching Hospital (NAUTH) antenatal care unit, two hundred were returned as validly completed giving a response rate of 200 (80.0%). In table one, three-quarter of the respondents were married 146 (74.5%) and half of the respondents were employed and pregnant between the ages of 25 to 34 years (their mean age was 27.1, SD \pm 5.54 years). Most of the respondents have had less than four deliveries 138 (69.0%) while almost two-thirds of them registered for antenatal care in the hospital in the first trimester (62.0%). More than half of the respondents indicated that they had only one pregnancy 108 (54.0%) which was their first pregnancy 109 (54.5%) (Table 1).

For the factors associated with access to healthcare facilities, the respondents reported that the nearest facility to them is a dispensary. However, 69.0% of employed respondents reported that access to healthcare facilities was not hindered by geographical barriers while 31% of the respondents reported that distance affects clinical attendance on the ANC days (Table 2). Most of the respondents (56.5%), responded that doctors were the source of their information about the prevention of malaria in pregnancy (Figure 1).

Most of the respondents agreed that the health education on pregnancy provided to them by the health provider during ANC visits was clear and concise. A majority of them (86.5%) acknowledged that health staffs were ready to answer their concern, but, only 10.0% of respondents reported that they were not given return dates by the health provider for their visit (Table 3). However, of the drugs listed for the prevention of malaria in pregnancy, a greater percentage of the respondents (55.0%) reported that they take sulphadoxine/ pyrimethamine for the prevention of malaria in pregnancy

Discussion

This study identified factors that affect the use of intermittent preventive malaria therapy among pregnant women at the Nnamdi Azikiwe University Teaching hospital in Nnewi, Anambra State, Nigeria. Most of the factors assessed were, registration time for the ANC services, sources of information on malaria prevention techniques, distance from healthcare facilities and how long it takes to walk to the healthcare facilities, opening hours of the healthcare facilities, knowledge of the use of sulfadoxine-pyrimethamine

for IPTp, Level of education of the pregnant women and the socioeconomic class of the pregnant women showed that these factors were favorable for the pregnant women to improve on the uptake and use of IPTp in pregnancy, however, none of the factors had a statistically significant effect

It was observed that a few of the respondents reported that geographical barrier affects their access to IPT even though it takes most of the respondents less than an hour to get antenatal care in the closest dispensary. Most importantly, it was also seen that a majority of the participants affirmed that distance was not a barrier to accessing antenatal care, this is contrary to a systematic review by Dahab and Sakellariou et al in 2020 [17], who reported that the most important barriers to maternal health are distance, economic factors, and cultural beliefs. The response about distance not being a barrier might account for the high number of pregnant women recorded on an antenatal visit to the ANC clinics; however, some of the respondents indicated that the nearest healthcare facility does not open every day. This is an indication of the poor functioning of the health care systems in Nigeria [18].

This study revealed that most women registered for ANC clinics in the first trimester of their pregnancy. This is good as it allows them enough time to attend several ANCs before delivery, gaining enough knowledge on pregnancy-related issues including the use of IPT by pregnant women; this is similar to a study in Gabon [19] and Tanzania [20]. In the studies in Gabon and Tanzania, the study showed that factors including like lack of awareness about the health benefit of antenatal care and late recognition of pregnancy affect timely utilization of IPT. Also in this study, it was observed that most pregnant women could afford the cost of attending ANC, as a majority of our study participants (90%) were in the middle and high socio-economic class hence the high number of ANC registration at this trimester of pregnancy. This is similar to a report in a study carried out in Gabon and Cameroon, which showed that ANC visits are affected the socioeconomic status of the women in Cameroon, [19,21].

Three-quarter of the respondents indicated that Sulphadoxine/Pyrimethamine (SP) is the intermittent preventive medication taken against malaria and the average time of commencement of the entire therapy was 17.99 ± 6.38 weeks. The large deviation in this value depicts the disagreement in the commencement of therapy as recommended by the World Health Organization (WHO) [6] and this is an indication of either poor compliance or inadequacies in the information passed down to the patient as seen in some studies in a systematic review by Dahab and Sakellariou in 2020 [17]. Ideally, the first SP dose is usually administered at the first ANC consultation if the pregnancy is 12-14 weeks [6,22]. In contrast, a study in Northeast Tanzania observed that earlier ANC attendance (<20 weeks) had only a little influence on the uptake of IPTp [20]. However, some studies showed that some women turn up to the ANC clinics pregnant at 32 weeks hence the time is insufficient for the second dose of SP before childbirth [21,23].

In the aspect of health care provider factors associated with uptake of IPTp-SP, a majority of the respondents indicated that the health education on pregnancy provided to them by health providers during ANC visits was clear and concise. They were also affirmative that they were given return dates by the health provider during their visits, this can also improve turn at the ANC clinic. This will also be an indicator of the high turnout of women for antenatal clinics. It is also worthy to note that most of the respondents reported that the health care staff (eg, the nurses) were ready to answer issues of concern to them. This result is seen in a similar study that compliance with clinic visits and routine medication intake is influenced by health education by health care providers [24].

This study has certain limitations. Due to recall bias, the study's findings may not be generalizable or impactful in their overall scope. Despite these limitations, our data provide useful information for the assessment and implementation of IPT in Nnewi, Anambra, Nigeria, and will also inform policy decisions in Nigeria and other low-income countries.

Conclusion

Most of the factors considered for the use of IPTp had positive effects; however, the effects were not significant. More effort is needed in the area of sensitization of pregnant women to enroll early in ANC and continuously attend to avail themselves of all the important information given during ANCs. The women should also be empowered to have enough financial capacity to procure the IPT and transport themselves to the clinic as and when due.

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