Original Research Article

Prevalence and effect of malaria in pregnancy among antenatal women in Ebonyi State, Nigeria

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Malaria remains an important contributor to the rising maternal mortality statistics recorded in sub-Saharan Africa. This study examined the prevalence and effect of malaria in pregnancy among women in Ebonyi State, Nigeria. This cross sectional study involved 128 women attending antenatal clinics in the health centers across the six autonomous communities (Igbeagu, Ndiezechi, Ndieze, Mgbalukwu, Ezza Inyimagu and Agbaja) in Izzi local government area Ebonyi state from July to December, 2016. A simple judgmental sampling technique was used to form participants' eligibility while convenient sampling technique was used to enroll participants into the study. Malaria test (mRDT) was conducted among the partakers while self (authors) constructed questionnaire was used to obtain data on the methods of malaria prevention and the effect of malaria infection among the respondents based on the reviewed literature. Prevalence and effect of malaria in pregnancy were analyzed using the frequency and percentage while Chi-square test was use to determine the relationship between personal demographic variables on the prevalence and effect of malaria in pregnancy at 5% level of significance. Prevalence of malaria in pregnancy was high (41%). The common health issues associated with pregnancy were anaemia (18%), low birth weight (13%), premature delivery (9%), miscarriage (9%) and threatened abortion (6%). Literacy level has significant influence on prevalence and effect of malaria in pregnancy (p=7.82). There was poor compliance (insecticide treated nets (45%), intermittent preventive therapy (IPT)/clearing of the surroundings 50(39%)) with the use of reliable methods of malaria prevention pregnancy. Advocacy on knowledge and behavior change practices should be directed towards the at risk women to effectively prevent malaria for improved quality of life during and after pregnancy.

Key words: Prevalence, effect, malaria, pregnancy, women

INTRODUCTION

The control of malaria still remain one of the main activities intended to reduce health problems associated with malaria in tropical and sub-tropical Africa, Nigeria included. Each year, approximately 25 million African women become pregnant in malaria endemic areas; and these women are at risk of *Plasmodium falciparum* infection during pregnancy (Rogerson et al., 2007). Research has shown that pregnant women are more susceptible to

Plasmodium infection, with more episodes of clinical malaria, increased prevalence and parasite density during the episode which reduces their immunity to infection (Enoch and Priscilla, 2015). Apart from the decrease in the immunological function, other factors such as poor environmental hygiene, poverty and ignorance have been implicated as the epidemiological factors causing significant maternal and child mortality (Chessed et al.,

2013).

In Nigeria, more than 90% of the total population of the country is at risk of malaria infection and about 50% of the population suffer from at least one episode of the disease annually (WHO, 2008; Okpere et al., 2010). Almost 30 million women are threatened by malaria in pregnancy annually with 10,000 maternal mortalities attributed to the disease each year and about 200,000 neonatal deaths annually (Okpere et al., 2010). Also, in Nigeria and other endemic countries, malaria have posed adverse clinical out-comes including maternal morbidity and mortality in first and second trimester, abortion, still birth, premature deliveries and low birth weight (Federal Ministry of Health (FMH) 2005; Obioun, 2007) anemia and death (Rogerson et al., 2007; Conroy et al., 2012).

Over the years, there has been intensive effort of the international agencies such as World Health Organization in collaboration with the governments and allied agencies to deal with the scourge of malaria in pregnancy through the use of insecticide treated mosquito bed nets (ITN); intermittent preventive treatment of malaria (IPT); and adequate case treatment of acute malaria attacks in pregnancy (Okpere et al., 2010). Despite these commendable efforts, repulsive prevalence of 65.6% malaria in pregnancy has been reported from a region in the south eastern part of Nigeria (Ivoke, 2013). Based on the above fact, it is imperative to know the prevalence and effect of malaria among women in the Eastern part of Ebonyi state to serve as a baseline data in health care plan. Hence, the study aimed to determine the prevalence and effect of malaria in pregnancy among women in Eastern part of Ebonyi State and to ascertain the relationship between the personal variables on the prevalence and effect of malaria in pregnancy.

MATERIALS AND METHODS

Study Design

This was a cross sectional survey involved 128 mothers attending antenatal clinic in the health centers in Izzi local government communities of Ebonyi state.

Study Area

Izzi Local Government is one of the 13 Local Government Areas in Ebonyi state Nigeria. It has population of 300,115 people according to 2006 census report (National population commission, 2006). It has six autonomous communities namely; Igbeagu, Ndiezechi, Ndieze, Mgbalukwu, Ezza Inyimagu and Agbaja Community. The area covers about 2, 264 squre kilometers with medium population density. Its coordinates are 6°34'60"N and 8°3'0"E in DMS (Degrees Minutes Seconds). It lies between latitude 45°-76° of Greenwich meridian and between 50°45° north of the equator. The people of Izzi experience equatorial types of climate. The rainfall is about 1800-2000mm perineum with longer season from March to July and shorter period from September to October then from November to March forms the dry season. It has an average temperature of 27degree Celsius. Izzi people are known for agricultural activity such as rice, yam and cassava.

Target Population

The population of this study comprised of all registered antenatal women in health centers cross Izzi LG from July to December, 2016. A total of 394 pregnant mothers registered within the study period.

Sample and Sampling Technique

Majority of the women usually present themselves for antenatal booking within 16 to 20th week of gestation hence, the eligibility factor was set at 20th week and above to ensure adequate coverage and data control. Out of the total population, 137 (72%) women met the inclusion criteria (simple judgmental sampling technique). After explaining the research purpose and procedure to the eligible participants, 9 (6.7%) subjects opted out due to fear of lancet prick.

Data Collection and Instrument

The consented participants (128) were tested for malaria using Rapid Diagnostic Test (mRDT) and in addition filled the study questionnaire on effect of malaria infection in pregnancy during antenatal visit. Authors constructed questionnaire was used to obtain data on the methods of malaria prevention (5-questions) and the effect of malaria infection (6-questions) among the respondents. Reviewed literature served as a guide in structuring the questionnaire.

Test Procedure

Rapid Diagnostic Test (mRDT), CareStart™ Malaria HRP2 (pf) product was used to test for malaria positive using blood sample. The test procedure was carried out using the following guidelines as identified by the Ghana Health Service (2015). First of all, we check the expiry date and ensure the test kit seals were intact before use, after which we put on hand gloves to prevent infection. Preferred finger based on participants' choice to be pricked was selected and disinfected with alcohol pad and allow to air dry. Using the provided lancet, the disinfected finger was pricked and wipe off the first drop of blood with dry sterile cotton. Capillary tube was used to draw blood sample. Then 5μl of blood was added into the sample well marked (S) on the cassette and 60μl of assay buffer solution into the 'A' well. Each result was read in 20 minutes. The test is positive when there is two color band (C and T), negative when only one line (C) presence and invalid when only one line (T) shows. No repetition for invalid test as only one test

Table 1. Personal Demographics Variables

Personal variables	Options	Frequency (%)
Age range	15-25 years	45(35%)
	26-35 years	50(39%)
	36-48years	33(26%)
Academic qualification	None	40(31%)
	FSLC	30(23%)
	WAEC	46(36%)
	OND and above	12(9%)
Occupation	Farming	73(57%)
	Trader	34(27%)
	Civil servant	21(16%)
parity	Primigravid	31(24%)
	Multigravid 11(21%)	97(76%)

Note: FSLC means, first school living certificate, WAEC-West African Examination Council, OND-Ordinary National Diploma

Table 2. Prevalence of Malaria in Pregnancy among Women Attending Antenatal Clinic

Months	mRDT result		Total
	Positive	**Negative**	
July	7(13%)	18(24%)	**25(19.5%)**
August	12 (23%)	10(13.5%)	**22(17.2%)**
September	10(19%)	13(17.5%)	**23(18.0%)**
October	11(21%)	9(12%)	**20(15.6%)**
November	7(13%)	12(16%)	**19(14.8%)**
December	6(11%)	13(17%)	**19(14.8%)**
Total	**53(41%)**	**75(59%)**	**128(100%)**

instrument was used.

Data Analysis

IBM SPSS Version 20 Statistical software was used to analyze the data. Prevalence and effect of malaria in pregnancy were analyzed using the frequency and percentage while Chi-square test was use to establish the association between personal variables on the prevalence and effects of malaria in pregnancy.

Ethical Consideration

The study was approved by the Ethics and Research Committee of the primary health care agency of Ebonyi State in accordance with the ethical standards laid down in the 1964 Declaration of Helsinki. Furthermore, informed consent was obtained from the participants. With due respect to ethical consideration, samples, data and other information obtained from the clients were handled with maximum confidentiality and used for the purpose of the study only.

RESULTS

Personal Variables

Out of the total population, majority 50 (39%) were within the age of 26-35 years, while 45(35%) were within the age of 15-25years with few 33(26%) aged 36-48 years. Only 46(36%) have completed their secondary education WAEC and 12 (9%) had tertiary education. Majority were farmers, 73(57%). More than one-third 97(76%) of the populations were multiparous (see Table 1).

Malaria Prevalence

Generally, (Table 2) the prevalence of malaria in pregnancy among antenatal women was high 53(41%). The high prevalence was recorded during August 12(23%), followed by October and September [11(21%) and 10(19%)] respectively. July and November had the same prevalence 7(13%) while December recorded the least 7(10%) prevalence (Figure 1).
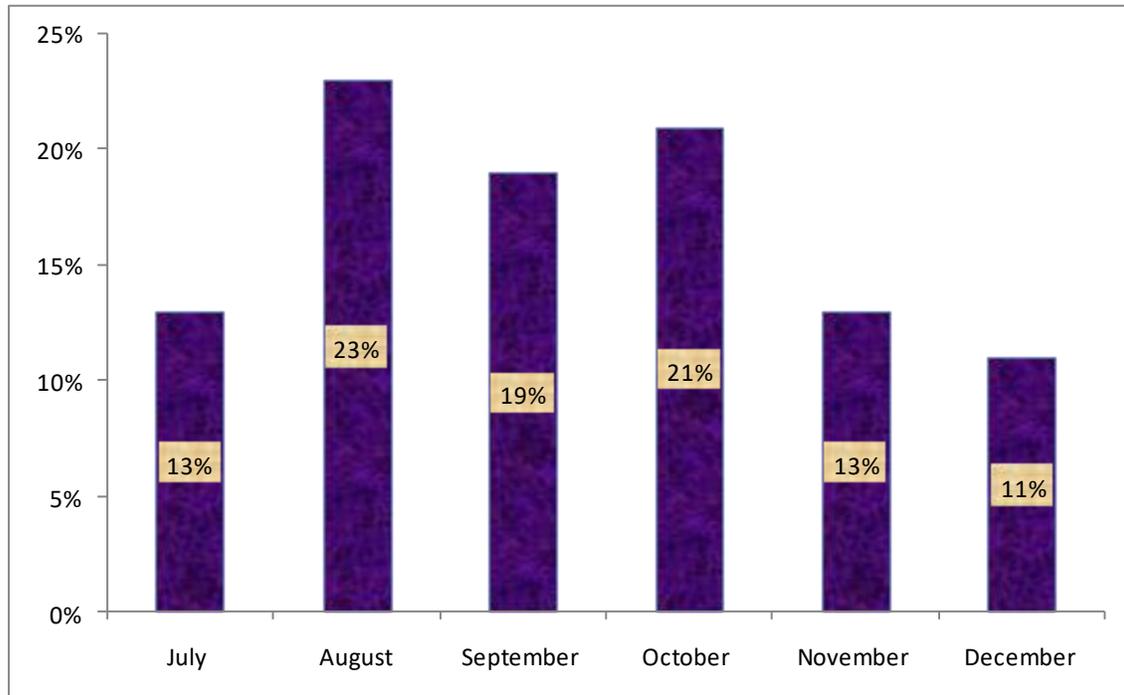
Figure 1: showing malaria Prevalence in Pregnancy among Women Attending Antenatal Clinic from July to December 2016.

Table 3. The usual methods of malaria prevention

Items	Yes	No
insecticide treated nets	57(45%)	71(56%)
Use intermittent preventive therapy (IPT)	50(39%)	78(61%)
Clearing of the surroundings	50(39%)	78(61%)
Netting of doors and windows	78(61%)	50(39%)
Spraying of insecticide at home	74(58%)	54(42%)

Table 4. Effect of malaria infection among the respondents

Items	Yes	No	Undecided
Suffered malaria during pregnancy	52 (41%)	45(35%)	31(24%)
Had threatened abortion	7(6%)	119(93%)	2(2%)
Became anemic	23(18%)	95(74%)	10(8%)
premature delivery	12(9%)	105(82%)	11(9%)
low birth weight	16(13%)	99(77%)	13(10%)
Miscarriage	11 (9%)	96(75%)	21(16%)

Methods of Malaria Prevention

In Table 3, it was established that a majority of the respondents do not use the reliable methods of malaria prevention in pregnancy. Netting of doors and windows was the common 78(61%) preventive practice. Other methods utilized were spraying of insecticide at home 74(58%), insecticide treated nets 57(45%), intermittent preventive therapy (IPT)/clearing of the surroundings 50(39%). In ability to use the effective methods must have been the reason for high prevalence.

Effect of Malaria Infection

Table 4 shows that Anaemia emerged as a leading health problem encountered by pregnant women as a result of malaria 23(18%). Other health problems included: low birth weight 16(13%), premature delivery 12(9%), miscarriage 11(9%) and threatened abortion 7(6%) (Figure 2).
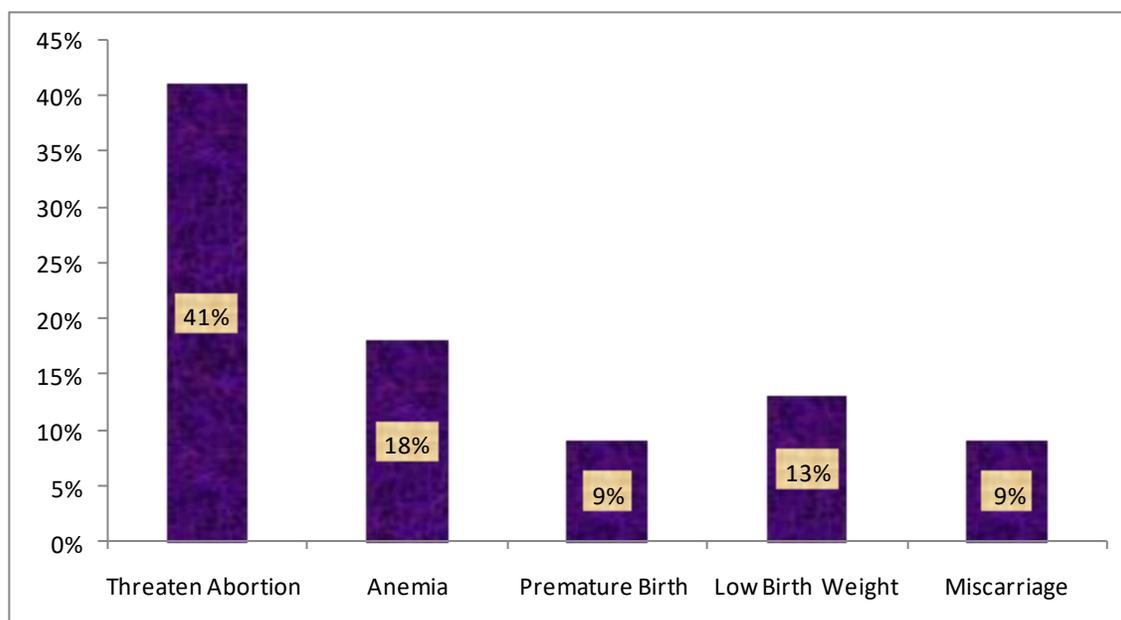
Figure 2: showing malaria effects in Pregnancy among Women Attending Antenatal Clinic from July to December 2016.

Table 5. No Significance different between the prevalence and effect of malaria in pregnancy in relation to personal variables

variables	Incidence				Effect			
	P+ve	N-ve	x^2	P-value	Yes	No	x^2	P-value
Age range	21	24	2.32	5.99	6	39	4.58	5.99
	22	28			9	41		
	10	23			3	30		
Academic qualification	21	19	21.35	7.82	19	21	10.11	7.82
	19	11			11	19		
	7	39			12	34		
	6	6			5	7		
Occupation	31	42	1.91	5.99	31	42	4.40	5.99
	16	18			9	25		
	6	15			4	17		
parity	13	18	0.01	3.84	11	20	0.66	3.84
	40	57			27	70		

Prevalence and effect of malaria in pregnancy in relation to personal variables

There is no significant relationship between the participants' age, occupation and parity on prevalence and effect of malaria in pregnancy except literacy levels (p=7.82)(see Table 5).

DISCUSSION

The prevalence of malaria in pregnancy among antenatal women was far above expectation. Comparable result from Eleme in Rivers State, Nigeria shows prevalence of 40.6% among the antenatal women (Enoch and Priscilla, 2015). Other studies (Adefioye, 2007; Nwagha, 2009) in Nigeria have recorded higher prevalence of 72% and 60% respectively. The cause of high prevalence of malaria in pregnancy is unknown but several studies have explained this increased risk to be due to changes in the cellular immune responses that otherwise should offer protection, and increased attractiveness of the pregnant woman to mosquitoes (Okpere et al., 2010). Okpere et al. also noted that cellular immune responses change is believed to result from the increased level of circulating maternal steroids in pregnancy. This has caused pregnant women to attract

twice the number of anopheles mosquito compared to their non pregnant counterparts (Lindsay, 2000).

There is significant relationship between literacy levels on prevalence of malaria in pregnancy. Study conducted by Mbah et al. (2015) from the neighboring state reported similar finding that illiterate mothers has the highest percentage of malaria infection with 55.56% positive and 44.44% negative. This study outcome wasn't a surprise because; majority of the medium used in the campaign against malaria prevention strategies our more accessible to educated people among the population.   Although, statistical test shows no association between the primigravidae and the multigravidae but study (Brabin, 1991) found that malaria positivity decreased as parity increased.

The use of insecticide treated nets and IPT during pregnancy was low. ITNs have been shown to be safe and devoid of toxity when used according to instructions (WHO, 2005). It is recommended that, the ITN should be retreated at least twice in a year with pyrethroid chemical. Despite its irrefutable health benefits, another study has shown poor utilization and knowledge of its potency in malaria prevention amongst the parturient due to ignorance Enato, 2007.

The emerging health issues pregnant women with malaria infection usually present were anemia, low birth weight, premature delivery, miscarriage and threatened abortion. Several studies (Brabin, 1983; Idowu 2005; Schantz-Dunn and Nour, 2009) have reported similar findings. Even though anemia in pregnancy has multiple causes, during pregnancy, malaria has the ability to cause haemolytic anaemia due to the destruction of the red blood cells by haemolysis.

Of all the variables tested, only literacy level was association with the effect of malaria in pregnancy. Despite this surprising finding, it is believed that mothers with little or no experience (nulliparous women) and poor educational background of the mothers can contribute to the exposure to the health consequences of malaria in pregnancy. However, other factors such as traditional method of malaria treatment, cultural and religious should be examined.

Adequate utilization of insecticide treated net and intermittent preventive therapy is the corner stone in prevention of malaria in pregnancy. Hence, there is need to step up in the effort to prevent malaria in pregnancy through educational campaign with the use of audio visual aids and local languages at all levels to improve the knowledge and awareness on the efficacy of the preventive strategies.

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