

PREVALENCE OF MALARIA AND ASSOCIATED RISK FACTORS AMONG PREGNANT WOMEN ATTENDING ANTENATAL CARE IN HEALTH INSTITUTIONS IN KANO STATE, NIGERIA

BY

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Abstract

Malaria due to Plasmodium falciparum in pregnancy is an important and major contributing factor to the high maternal morbidity and mortality in sub-Saharan African. About 47% of pregnant women are diagnosed with malaria in Nigeria. Pregnant women compared to non pregnant women are at an increased risk of malaria and the severity of the clinical manifestation experienced by these women and their foeti depend on the level of pre-pregnancy immunity. Hence, this study was conducted to determine the prevalence and risk factors of malaria among pregnant women that attend antenatal clinics in health institutions in Kano State, Nigeria. A health institution based cross-sectional study was conducted. Data were coded, entered and analyzed using SPSS version 20. The overall prevalence of malaria was 8.2% and the prominent species was Plasmodium falciparum (5.4%). Individuals in the third trimester were more infected (5.0%) than those in second (2.4%) and first (1%). Multigravidae (AOR: 0.1, 95% CI: 0.001-0.07), using ITN always (AOR: 0.01, 95% CI: 0.03-0.31), using Indoor IRS in the last twelve months (AOR: 0.02, 95% CI: 0.01-0.05) and family size 1-3 (AOR: 0.27, 95% CI: 0.01-0.90) were identified as protective factors of malaria among pregnant women. The overall prevalence of malaria in pregnant women requires special attention. Efforts should be made to minimize the problem by promoting frequent visiting of antenatal clinics and supplying bed nets. The paper concluded that the prevalence of malaria among pregnant women in the study area was relatively high. The paper recommended that pregnant women should be health educated to appreciate the use of these protective measures and these should be provided at subsidized cost to ensure compliance.

Keywords: Antenatal care, Health institution, Malaria, Pregnant women, Prevalent and Risk factors

Introduction

Malaria is a life-threatening disease caused by parasites belonging to the genus Plasmodium transmitted from infected individuals to other people via the bites of infected female Anopheles mosquitoes. Other comparatively rare mechanisms for transmission include congenitally acquired disease, blood transfusion, sharing of contaminated needles, organ transplantation, and nosocomial transmission (Gruel, 2017). Five malaria parasite species Plasmodium falciparum, Plasmodium malariae, Plasmodium ovale, Plasmodium vivax and Plasmodium knowlesi are responsible for the cause of malaria in humans, and two of these species P. falciparum and P. vivax cause the greatest threat (CDC, 2018). Malaria is one of the most serious and a major public health problem in the world and has been consistently reported as one of the leading cause of morbidity and mortality. As the 2018 WHO report indicated malaria is still one of the most serious and a major public health problem in the world (Gruel, 2017). Malaria in pregnancy is a major public health problem in sub-Saharan Africa, where about 35 million pregnant women are at risk of malaria infection annually (WHO, 2016). During pregnancy, malaria can lead to several adverse pregnancy associated consequences including intrauterine growth retardation, abortions, stillbirths, preterm delivery, low birth weight, maternal anemia and maternal and infant mortality. Women predominantly at high risk of malaria associated complications during pregnancy are those with relatively low levels of previously acquired immunity (Recker, 2009).

Pregnant women especially from unstable transmission areas were at higher risk of hospitalization and fatal outcomes including their fetuses. Since there was variation in prevalence of malaria among pregnant women within and between countries, having local data will be essential to consider protective measures accordingly (Newman, 2003). Hence, this study was conducted to determine the prevalence and associated risk factors of malaria among pregnant women attending ANC in health institutions in Kano State, Nigeria.

Statement of the Problem

The researcher observed that pregnant woman and their children are believed to be the mostly attackable to malaria. Malaria in Nigeria is recognized as the leading public health problem where several initiatives have been implemented over the years to control malaria in pregnancy. Malaria caused 10,000 of these women and 200,000 of their infants death as a result of malaria infection and severe malaria anaemia where pregnant woman and their

children are believed to be the mostly attackable to malaria. Kano State implemented anti-malaria control programme with the goal of significantly reducing the burden of disease consequent upon malaria. In spite of the successes, the researcher observed that there is still a lot to be achieved by way of reduction in the incidence of malaria. Apart from the uptake of intermittent preventive treatment by the pregnant women, there is also a default in the doses of those who take drugs otherwise not prescribed by any medical practitioners which is very dangerous to their health. It is on this note that this study sets to investigate the Prevalence of Malaria and associated risk factors among Pregnant women attending antenatal care in health institutions in Kano State, Nigeria

Objectives of the Study

The aim of this study was to investigate the Prevalence of Malaria and associated risk factors among Pregnant women attending antenatal care in health institutions n Kano State, Nigeria

The specific objectives include:

1. To investigate the Knowledge of malaria infection among pregnant women attending antenatal clinics in health institutions in Kano State, Nigeria.
2. To examine the risk factors associated with malaria among pregnant women attending antenatal clinics in health institutions in Kano State, Nigeria.

Research Questions

The following research questions were stated for this study:

1. What is the Knowledge of malaria infection among pregnant women attending antenatal clinics in health institutions in Kano State, Nigeria?
2. What are the risk factors associated with malaria among pregnant women attending antenatal clinics in health institutions in Kano State, Nigeria?

Research Hypotheses

The following research hypotheses were stated for this study:

1. There is no significant difference of Knowledge of malaria infection among pregnant women attending antenatal clinics in health institutions in Kano State, Nigeria
2. 1. There is no significant difference of the risk factors associated with malaria among pregnant women attending antenatal clinics in health institutions in Kano State, Nigeria

Methodology

The study was conducted in four primary Health Centers of Kano State. The population of the study was 115558. Pregnant women attending antenatal clinic (ANC) in the four health centers and willing to participate in the study were included after signing informed consent. The sample size of this study was calculated by using the formula to estimate a single population proportions, with the following assumption, anemia prevalence 50%, with confidence level of 95%, margin of error of 5 and 10% non-response rate. Total sample size of 422 pregnant women were selected by using systematic random sampling technique, where the first one was selected randomly during visit to ANC; every other one was selected till the total sample size was attained. Standard structured and pre-tested questionnaires were used to collect socio demographic data. Data on prevalence of malaria and species type was congregated by dropping finger prick blood of each participant on labeled slide and preparing thick and thin smear and observing under light microscope. Data were entered, cleaned and analyzed using SPSS version 20 for windows (SPSS). Descriptive statistics were employed to describe the study population. Bivariate and multivariate logistic regression analyses were done to identify independent predictors of malaria. Variables with p value < 0.25 by the bivariate analysis were candidates for the multiple logistic regression model. P < 0.05 was considered as statistically significant.

Results

More than 99% of the respondents had information about malaria and majority (83.2%) claimed that their source of information was health workers and community meetings. Nine in ten (91.7%) women knew that malaria was transmitted by the bite of mosquitoes. Moreover, 346 (82%) of the participants were fully aware that ITNs protect from mosquito bite and play a major role in controlling malaria transmission. Three hundred and fifteen (74.6%) mentioned that they obtained ITNs from public health facilities and 308 (73%) stated that they use ITNs regularly. Almost 80% perceived that using Indoor Residue Spray (IRS) was advantageous, since it killed mosquitoes, while 91 (21.6%) worry that IRS has side effect due to its bad smell and with the fear that it may kill domestic animals

Table 1: Knowledge of malaria among pregnant women attending antenatal clinics in health institutions in Kano State, Nigeria

Knowledge	Number	Percent
Way of transmission		
Biting of mosquito	387	91.7
Biting of bee	-	-
Contamination of food	35	8.3
Protective measures		
Use of ITN	346	82
Cleaning environment	35	8.3
Scents-smock	41	9.7
Do you use ITN regularly		
Yes	308	73
No	114	27
Did you sleep under ITN last night		
Yes	334	79.1
No	88	20.9
Opinion about IRS		
Advantageous	331	78.4
Side effect	91	21.6
Source of information		
Media	72	17
Health workers	190	45
Community meeting	160	38
Source of ITN		
In public health facility	315	74.6
In private health facility	33	7.8
Buying from shop	74	17.6

Multiple logistic regression analysis was performed to identify independent predictors of malaria among pregnant women. Ten explanatory variables that were associated with malaria in bivariable analyses at 25% level of significance were entered into multiple logistic regression model, in the last step of analysis, seven variables were excluded. Family size, gravidity, use of ITNs, and use of IRS in the last twelve month showed significant association with prevalence of malaria $P < 0.05$. Accordingly as the adjusted odds ratio result indicated having family size less than or equal to three, 73% (AOR: 0.27, 95% CI: 0.01-0.90) less likely exposed to malaria than family size greater than 3. Multigravidae 90% (AOR: 0.1, 95% CI: 0.001-0.07) less likely infected with malaria as compared to Primigravidae. Women using ITNs always were 99% (AOR: 0.01, 95% CI: 0.03- 0.31) less likely infected with malaria as compared to those not using at all. In addition use of IRS in the last twelve month was 98% (AOR: 0.02, 0.01-0.05) protective than not using.

Table 2: Risk factors associated with malaria among pregnant women attending antenatal clinics in health institutions in Kano State, Nigeria

Variable	Category	No. exam. (%)	+ve (%)	COR(95% CI)	P value	AOR (95% CI)
Education	Illiterate	48 (11.4)	10 (20.8)	1		1
	Elementary	151 (35.8)	21 (13.9)	0.61(0.38-1.00)	0.26	4.44
	Secondary	151 (35.8)	7 (4.6)	0.19 (0.10 -0.34)	0.03*	4.71
	College and above	72 (17)	1 (1.4)	0.05 (0.02-0.18)	0.01*	2.61
Occupation	Daily laborer	102 (24.2)	14 (1.7)	4.14 (1.95-8.76)	0.03*	0.58

(0.57-3.90)	House wife 0.64	121 (28.7)	15 (13.2)	3.67 (1.74-7.70)	0.05*	1.49
(0.15-1.91)	Merchant 0.58	124 (29.4)	5 (4)	1.01 (0.43-2.38)	0.99	0.54
	Gov't employee	75 (17.8)	3 (4)	1		1
Family size (0.01-0.90)	1-3 0.04**	112 (26.6)	6 (5.4)	0.36 (0.21-0.61)	0.03*	0.17
(0.03-1.06)	4-6 0.06	182 (43.1)	10 (5.5)	0.38 (0.25-0.59)	0.01*	0.07
	7 & above	128 (30.3)	19 (14.8)	1		1
Gestation Period (0.05-7.34)	First trimester 0.69	141 (33.4)	7 (5)	1		1
(0.39-51.26)	Second trimester 0.23	165 (39.1)	14 (8.5)	0.28 (0.16-0.49)	0.21*	0.61
	Third trimester	116 (27.5)	18 (15.5)	0.52 (0.33-0.79)	0.08*	4.44
Use of ITN (0.03-0.31)	Use always 0.001**	311 (73.7)	6 (1.9)	0.01 (0.01-0.02)	0.00*	0.01
(0.05-0.58)	Use some times 0.03**	90 (21.3)	18 (20)	0.10 (0.05-0.19)	0.00*	0.30
1	Don't use	21 (5)	15 (71.4)	1		
Use of IRS (0.01-0.05)	yes 0.00**	331 (78.4)	4 (1.2)	0.02 (0.01-0.04)	0.00*	0.02 (0.
1	No	91 (21.6)	35 (38.5)	1		

Discussions

Of the total of 422 pregnant women who attended the antenatal clinics in the four health clinics in health institutions in Kano State, Nigeria 8.2% were found to be infected with malaria. The result was also similar to other reports of investigations conducted in Liberia (10.4%), Sudan (13.7%), Malawi (8.9%) and Rwanda (13.6%) (Van Geertruyden, 2005). The finding was greater than other investigations conducted in malaria endemic areas of Ethiopia (1.8%), India. The lower prevalence might be associated with high utilization of ITN by most of the women and improved awareness of the women about the transmission of malaria and possible other prevention ways. In addition, it might be also associated with strengthened efforts of local, regional and national level health authorities that work in the prevention, management and control of malaria by giving special consideration to pregnant women. However, investigation conducted in Sudan, Mali and Angola indicated no association between parity and malaria infection. The highest prevalence in primigravidae might be associated with suppressed immune status of the pregnant women, which make the women more susceptible to malaria as compared to the multigravidae, whose immune system was more competent due to exposure to the parasite during successive pregnancies (Campos, 2012). The highest prevalence of malaria in the present case was recorded in third trimester of pregnancy, which was in line with studies carried out in Angola, Nigeria and Mali (Adam, 2005). This is because as recent investigations (Hile, 2013) revealed women in the first trimester have more tendency to be protected from malaria, as the stage increases their prevention level decreases and infection rate increases due to weak immunity at third trimester stage. Contrast previous investigations conducted in Gambia, indicated the prevalence was higher in the first trimester and, other investigations reported high prevalence of malaria in the second trimester of pregnancy (Brabin, 2003).

The current investigation revealed that, households having family size less than or equal to three members have less chances of having a malaria case as compared to family having members greater than three. This finding has also been confirmed by other earlier studies which indicated the prevalence of malaria increased as family members increased (Abdalla, 2017). Frequent utilization of ITN significantly protected pregnant women from malaria infection. Similar findings were stated in study conducted in Northwest Ethiopia and Nigeria (Fana, 2015) which indicated that threat of malaria increases with a decrease utilization of ITNs. The report of WHO also indicated that use of ITNs efficiently decreases both the number of malaria cases and deaths in pregnant women (WHO, 2016).

Women that used to live in houses sprayed with IRS in the last twelve months were considerably protected from malaria than those not. Similarly, this has been reported in other malaria endemic areas North West Ethiopia, Uganda, Cameroon and India (Sohail, 2015) where IRS significantly lowered malaria prevalence.

Conclusion

In the present study, the prevalence of malaria among the pregnant women in the study area was relatively high. Hence, the prevention and controlling strategies existing in the study area should be reviewed and intervention strategies should focus on associated risk factors among pregnant women. The pregnant women knowledge of symptoms of malaria and use of ITNs as protective measure against mosquito bite is also high. Thus, the responsible health professionals at different level particularly in the health office and health extension workers need to further strengthen.

Recommendations

Based on the results of this study, the following recommendations were made:

1. Stakeholders should ensure that clinical diagnosis must be confirmed by a laboratory parasite based diagnosis before the administration of anti-malarial, and the distribution of insecticide treated nets.
2. Health professionals should give health education about malaria prevention methods during ANC to improve health-seeking behaviour with the aim of preventing malaria infection among pregnant women and young children.
3. Further research is recommended by using more sensitive diagnostic methods like PCR and blood film microscopy for the diagnosis of malaria.

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