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Assessment of Risk Factors in Antenatal Women at Ishaka Adventist Hospital, Uganda.

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In the sub-Saharan Africa, malaria affects an estimated 24 million pregnant women and the region records the greatest severity of malaria accounting for 90% of all the deaths. Thus, this study is aimed at determining the possible risk factors for malaria among pregnant women attending ANC at Ishaka Adventist Hospital. This was a cross sectional study carried out among 185 pregnant women after informed consent was obtained. Data on demographic factors and prevalence of malaria was collected using a pretested questionnaire. Collected data was entered and analyzed using the IBM SPSS 25. Of the total 185 pregnant women in the study, 19.5% were infected with malaria parasites. This study found that lower gravidity, non-usage of ITNs and not taking IPT were the major factors associated with an increased risk of malaria infection in pregnancy. The control measures available in the area should be reviewed and emphasis should be placed on adequate sensitization on usage of ITNs and IPT should be taken from the health facility to ensure high coverage. Awareness on malaria prevention measures during pregnancy should target young women even before marriage preferably at schools, and social and religious gatherings.

Keywords: Risk factors, Pregnant women and Antenatal clinic

INTRODUCTION

The known risk factors for microscopic malaria in pregnancy on high transmission areas are primigravity, younger maternal age and second trimester [1; 2]. On low transmission and seasonal malaria areas the gravidity hasn't been so strongly associated to risk of malaria. These suggest that in high and stable transmission areas immunity acquired is associated to both age and parity [3; 4; 5]. For the prevention of malaria in pregnancy WHO recommends the use of long-lasting insecticidal nets (LLINs), intermittent preventive treatment in pregnancy (IPTp) with sulfadoxine-pyrimethamine (SP) in areas of moderate to high transmission and prompt diagnosis and effective treatment of malaria [6; 7]. Maternal characteristics as risk factors are quite commonly investigated but environmental factors affecting malaria prevalence hasn't been much studied, with the exception of bed net availability and usage [8; 9; 10]. Obliviously, a lot of studies about the benefits of IPTp has been done, but they are not referred here. In many countries, Malaria Indicator Survey (MIS) has been conducted regularly to determine the availability and usage of malaria control measures including insecticide treated bed nets (ITN) and determining the prevalence of malaria in risk groups and/or general population. In Eritrea at MIS 2015 the coverage of bed nets was high, at least one bed net was owned by 90 % of households and 87 % had at least one ITN. Of pregnant women, 60 % had slept under an ITN the previous night. The malaria prevalence in general population was 1.1 % (95 % CI 0.9–1.3) [11]. In South Sudan, MIS 2012 showed that the prevalence of malaria was 24.5 % (95 % CI 23.0–26.1) among general population and among pregnant women 9.9 % (95 % CI 7.4–13.1) [12]. The proportion of households with at least one bed net was 59.3 % (95 % CI 57.5–

61.6), and 35.9 % (95 % CI 31.9–40 .2) of pregnant women had slept under the net the previous night. For environmental factors affecting malaria prevalence among pregnant women, not many studies were available. In six studies the association between malaria prevalence in pregnancy and ITN coverage or usage was analyzed [13, 14, 15, 16]. The effect of season in the prevalence of malaria among pregnant women was analyzed in three studies with inconsistent findings [13; 14, 17, 18,19]. High-risk season was associated with higher malaria prevalence in one study [15; 16, 20, 21, 22], but two studies found no association between dry or rainy season and prevalence of malaria. The effect of housing conditions and materials of walls, roofs, floors and windows on the prevalence of malaria was investigated in general population [23, 24, 25]. The poor wall materials were found to be associated with prevalence of malaria [26, 27, 28, 29]. Another study found association between household size and malaria prevalence in pregnant women. Only two of the studies above included submicroscopic infections to the analysis [30, 31, 32, 33, 34]. The need for malaria control strategies specifically targeted to pregnant women was evaluated in two studies. In the South African study of the prevalence of malaria was low (0.07 %) [17; 18; 19, 35, 36, 37, 38]. They suggest that malaria control measures for entire population benefit also during pregnancy, and there is no need for measures specifically aimed for pregnant women. Another study investigated if a universal bed net campaign would reduce the burden of malaria among pregnant women in Malawi [20; 21]. Following the bed net campaign, the use of bed nets increased from 50.3 % to 66.2 %. At the same time the prevalence of malaria decreased from 28.4 % to 15.0 %. However, there was no association between malaria infection and bed net use in individual level. Contradictory to the study [22; 23; 24], this study suggests that besides universal anti-malarial measures, specific strategies targeting pregnant women are still needed. All women had their first or second pregnancy, being in higher risk of malaria, which may explain the high prevalence [25; 26; 27]. And in the end, the bed net coverage in Malawi is still quite low, and as a universal method it cannot be compared with the yearly IRS of every household.

Aim of the study

This study explored risk factors associated with malaria among pregnant women attending ANC at Ishaka Adventist hospital, Uganda.

Specific objective of the study

To assess the risk factors of malaria among pregnant women attending ANC at Ishaka Adventist hospital.

Research question

What are the risk factors of malaria among pregnant women attending ANC at Ishaka Adventist hospital?

METHODS

Study area

The study was conducted in Ishaka Adventist Hospital and more specifically MCH clinic. The Ishaka Adventist Hospital which was founded in 1950, is a community hospital in the town of Ishaka, Bushenyi District, Western Uganda .The hospital is a mission facility administrated by the seventh Day Adventist church and it caters for the local population, who are mainly subsistence farmers. The hospital is located 77kilometers west of mbarara, which is the largest town in the subregion. The hospital also maintains a training school for nurses and there is large nursing cohort on the staff. The hospital specialises in maternity care and infectious diseases.

Funding status NGO/charity. It has 110 bed numbers .The hospital has a catchment area of about 28000 people and is affiliated with the American Loma Linda University, which is located in Loma Linda, California. The hospital has both inpatient and outpatients and outpatient department works from Monday to Friday.

Study design

The study was retrospective cross sectional and utilized quantitative method of data collection.

Study population

Study population included all women attending ANC at Ishaka Adventist hospital.

Inclusion criteria: records of pregnant women who attended ANC at Ishaka Adventist Hospital for the last 6 months (from February 2018-July 2018) and tested for malaria

Exclusion criteria: pregnant women who did not test for malaria. And those that attended ANC before February or after July 2018.

Sample size determination

The sample size required for the study was calculated based on the formula by Kish and Leslie to estimate a single population proportions [28].

$$N = \frac{Z^2\, p(1-p)}{\delta^2}$$

Where,

N = estimated sample size

P = anticipated proportion of pregnant women with malaria. Similar study at Mulago hospital found only prevalence of 14%, so P was taken to be 0.14

Z = standard normal variation ant 95% confidence (1.96)

δ = margin of error (5%)

The calculated sample size was, $\frac{1.96^2\, x\, 0.14(1-0.14)}{0.05^2}$ **= 185 sample was taken.**

Sampling procedure and techniques Convenient sampling was employed to get list of women who attended ANC and tested for malaria from the register. Then systematic sampling was used to get the sample required. The list was created and numbered from number '1' up wards. Only names with even numbers was selected for the study until the required number 185 was reached.

Data collection procedures

Data collection instruments

Data was collected by reviewing records from antenatal register, using structured pretested checklist.

Variables

Dependent variables

Prevalence of malaria in pregnancy.

Independent variables

Socio demographic: - age, sex, religion, educational background, marital status, employment status, gravidity, IPT use, ITN use and area of residence.

Data processing and analysis

The checklist was checked for completeness, missed values and then manually cleaned up on such indications before living the study area. Data was coded and entered in to IBM SPSS version 25. Data was cross checked for consistency and accuracy, after data clearing, data was analyzed and presented in tables and charts.

Ethical Consideration

Ethical clearance was obtained from faculty of clinical medicine and dentistry in form of introduction letter. The copy of introduction letter was taken to the Ishaka Adventist hospital administrator to seek permission to collect the data.

Dissemination of results

The finding of this study was disseminated to the faculty of clinical medicine and dentistry and Ishaka Adventist Hospital administrator.

RESULTS

Demographic characteristics of pregnant women in the study

Characteristics of the 185 participants in this study are summarized in Table 1. The age of participants ranged from 18-38 with mean age of 26.6 ± 4.6 years standard deviation. Majority (86.5%) had education of primary or below, 90.3% were married however only 4.9% were employed. 25.0%, 21.6%, and 17.3% had primary, secondary and tertiary education, respectively.

Table 1: Demographic characteristics of the participants (N=185)

Characteristics of participants		Frequency	Percent
Age group	18-23	51	27.6
	24-29	92	49.7
	30-35	32	17.3
	36-41	10	5.4
Education level	primary and below	160	86.5
	Secondary	18	9.7
	Tertiary	7	3.8
Marital status	Married	167	90.3
	Single	7	3.8
	Others	11	5.9
Occupation	peasant	144	77.8
	employed	9	4.9
	business	32	17.3
Area of residence	Rural	145	78.4
	Urban	40	21.6

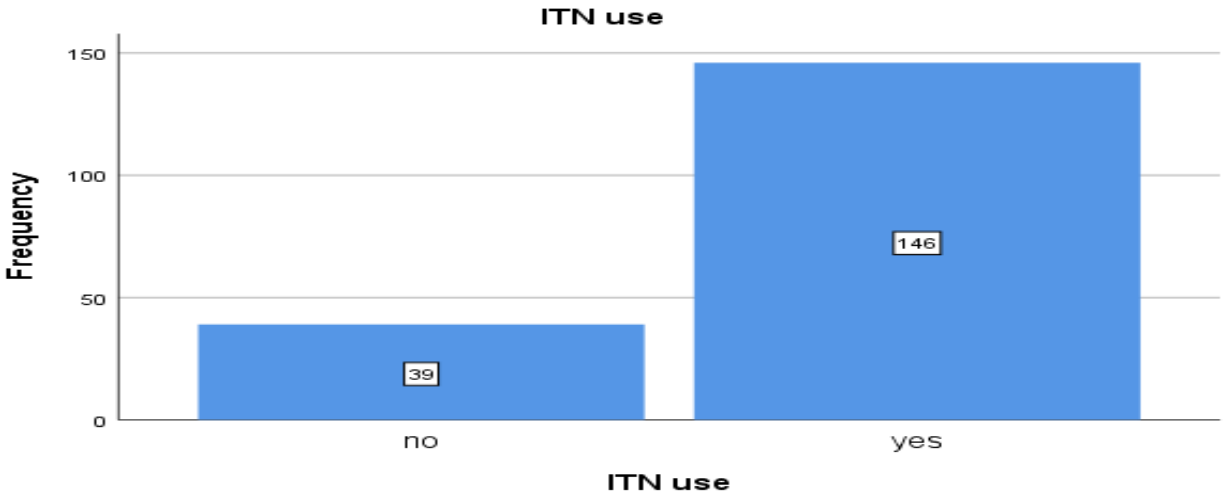

Figure 1: ITN use among pregnant mothers (N=185)

Figure 1 above shows that 146 participants (78.9%) were using ITN. However, 39 participants (21.1%) were not using the ITN.

Multivariate logistic regression analysis of risk factors associated with malaria in pregnancy

To identify the risk factors associated with malaria in pregnancy, the researcher conducted a multiple logistic regression analysis and results are summarized in table 3 below.

According to the gravida of women, results showed that primigravida woman had a three times risk of having malaria in pregnancy (OR=2.99; CI= 1.230-7.251; p<0.016) compared to those who were multi gravidas. For ITN use, findings show a remarkable decrease of malaria to those who were sleeping under ITNs (OR=0.01; CI= 0.002-0.022; p<0.001) compared to those who did not sleep under ITNs. About IPT, pregnant women who had taken IPT had a very low risk of having malaria in pregnancy (OR= 0.03; CI= 0.012-0.080; p<.001) compared to those who had not taken IPT.

Table 2: Multivariate logistic regression analysis of risk factors associated with malaria in pregnancy

Characteristics		OR	95%CI	P-value
Gravidity				
	primigravida	2.99	1.230,7.251	0.016
	multigravida	1		
ITN use				
	No	0.01	0.002,0.022	<0.001
	Yes	1		
IPT taken				
	No	0.03	0.012,0.080	<0.001
	Yes	1		

DISCUSSION

In this study, it was observed that mother's gravidity was associated with malaria prevalence, showing that a primigravida woman is at a greater risk of malaria infection that a multigravida woman. Similar findings have been reported in Mulago national referral hospital where prevalence was observed to decrease as gravidity increased [1]. It has been reliably established that infection rates are higher in women in their first and second pregnancies, with lower rates in later pregnancies [3]. This is understandable as pregnancy is naturally accompanied by general immune suppression that may cause loss of acquired immunity to malaria especially among primigravidae. There was a strong association between ITN use and malaria infection. Prevalence of malaria among pregnant women in the under the study decreased significantly with the increase in ITN use. The use of ITNs decreases both the number of malaria cases and malaria deaths in pregnant women [6]. A previous study conducted in Fortportal, Western Uganda also indicated that the rate of malaria in pregnancy decreases with the increase in the use of ITNs [28]. This study further shows that malaria prevalence among pregnant women was significantly associated with the use of IPT. Women who had taken IPT had reduced risk of getting malaria compared to those who had taken IPT. This finding concurs with that reported in Ghana, where IPT usage greatly influenced the prevalence of malaria in pregnancy [29]. However, the study in western Uganda did not find IPT in take to be significant [30]. The author in the later study reported resistance to fansidar to have been the reason and he recommended alternative measures to be used.

CONCLUSION

Malaria is still a major public health problem among pregnant women in Africa. This study found that lower gravidity, non-usage of ITNs and not taking IPT were the major factors associated with an increased risk of malaria infection in pregnancy. The control measures available in the area should be reviewed and emphasis should be placed on adequate sensitization on usage of ITNs and IPT should be taken from the health facility to ensure high coverage. Awareness on malaria prevention measures during pregnancy should target young women even before marriage preferably at schools, and social and religious gatherings.

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