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Malaria in Pregnancy and Adverse Outcomes at Kampala International University Teaching Hospital, Uganda.

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ABSTRACT

The study aimed to determine the prevalence of malaria in pregnancy and its adverse outcomes in women attending KIUTH from November 2018 to March 2019. The cross-sectional retrospective study found a high prevalence of 42 (17.1%), with 64.3% of pregnant women getting malaria during their second or third pregnancy. The majority of pregnant mothers were between the ages of 26-35 years old, with 57.1% sleeping under insecticide-treated mosquito nets. 33.3% had anemia, and 14.3% gave birth to low-birth-weight babies. The study concluded that malaria in pregnancy remains a challenge, and recommendations included increased mass sensitization for pregnant mothers to continue sleeping under treated mosquito nets and encouraging pregnant mothers to attend all ANC services to be health educated on preventive measures against malaria. The government should also provide more mass sensitization and health education to pregnant mothers.

Keywords: prevalence, malaria, pregnancy, adverse outcomes

INTRODUCTION

Malaria during pregnancy is a serious public health problem in sub-Saharan Africa with about 10,000 maternal deaths and 200,000 infant deaths annually. Most of these deaths are caused by *Plasmodium falciparum*, which is found in tropical and subtropical regions [1-4]. In endemic areas, approximately 25 million pregnancies are at risk of *P. falciparum* infection every year, and 25% of these women have evidence of placental infection at the time of delivery [5-7]. Each year between 100 000 to 300 000 infant deaths may be attributable to maternal malaria in Africa [8-9]. Literature shows that, pregnant women are more susceptible to malaria compared to their non-pregnant counterparts because pregnancy reduces woman's immunity, making her more susceptible to malaria [10-11]. Studies show that the risk of peripheral malaria is higher in mothers who were younger, infected with HIV, had less education, lived in rural areas or reported no bed net use, whereas the risk of placental infection was associated with more frequent malaria infections and with infection during late pregnancy [12-14]. Women in first and second pregnancies are noted to have higher parasitic concentration than others with greater than two pregnancies [15-16]. However, with successive pregnancies, the frequency and severity of the disease is known to decline [17-18]. Studies have also revealed an association between malaria infection rates and the period of pregnancy [19-20]. An epidemiological study conducted in several countries in Africa, revealed an interesting pattern of the infection. Higher rates were observed during the first few weeks of pregnancy, which peaked during the second trimester. The rates declined in the last trimester and after pregnancy [21-24].

Uganda is one of the 15 malaria high-burden countries marked on the global map, with a widespread adverse outcome of malaria in pregnancy on both maternal and child health. Although Uganda is regarded as being a malaria-endemic region, the transmission level varies considerably across the country; high rates of malaria disproportionately affect young children and pregnant women in rural areas who experience extreme poverty, limited access to healthcare services, and lack of education [25]. The disease contributes significantly to maternal and neonatal morbidity and mortality; these range from maternal anemia, low birth weight stillbirths, abortions, and maternal mortality [26-27].

Therefore, Malaria in pregnancy (MiP) is a major public health problem in endemic areas of sub-Saharan Africa and has important consequences on birth outcome. Because MiP is a complex phenomenon and malaria epidemiology is rapidly changing, additional evidence is still required to understand how best to prevent and control malaria [28-30].

METHODOLOGY

Research Design

This was a cross sectional retrospective study to determine the prevalence of malaria in pregnancy and associated adverse outcomes in KIUTH during the month of November 2020 to March 2021.

Study Area

The research was done at KIUTH, located in Ishaka – Bushenyi municipality, Bushenyi District, Western Uganda.

Study Population

This included pregnant women attending KIUTH antenatal clinic and those admitted to Obstetric/labor ward from January 2012 to December 2012.

Inclusion criteria

Pregnant women who attending antenatal clinic and those admitted to Obstetric /labor ward during the period of the study with informed consent were included in the study.

Exclusion Criteria

Pregnant women who were critically ill to freely participate in the study or those with partial information were excluded.

Sample Size Estimation

The Kish and Leslie formula was used to calculate the sample size for the research.

$$n = \frac{Z^2_{\alpha/2} \times P(1-P)}{D^2}$$

Where $Z^2_{\alpha/2}$ is the standard normal value at the 95% CI level = 1.96,

n is the sample size,

D is the precision of 5% =0.05,

P is the previously reported prevalence for malaria in pregnancy. A prevalence of 20% was used following a study done by Fatuma Namusoke et al in Mulago hospital in 2010. Therefore P= 0.2.

$$n = \frac{(1.96)^2 \times 0.2(1-0.2)}{(0.05)^2} = 245.8624$$

A sample size of 246 was found by using the formula above.

Sample Technique

Non random sampling technique was used on every pregnant woman's records from KIUTH.

Data Analysis and Presentation

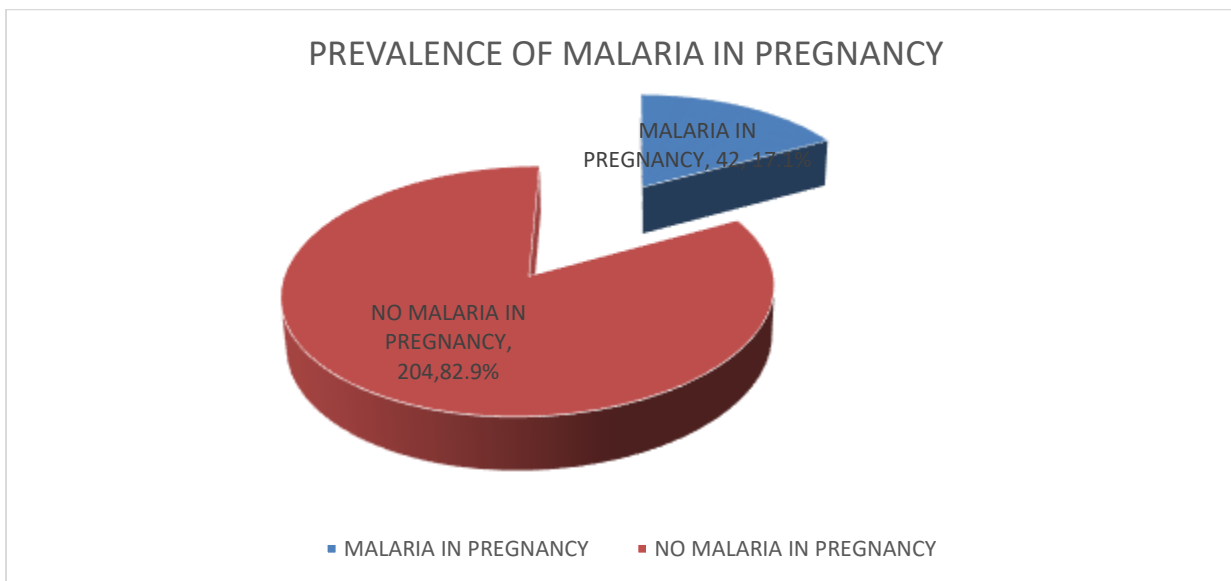
Raw data collected was analysed using IBM SPSS software version 20.0. Variables were cross tabulated and relations explore using multinomial logistic regression model. Analysed data was presented in forms of frequencies, central tendencies (means, median), dispersions (variations, standard deviations), charts and graphs.

Ethical Considerations

A letter from the dean's office was obtained to introduce the researcher and to facilitate access to the hospital records needed. For confidentiality purposes, the patient's identities were not included in the data collected and all legal protocols were taken into consideration.

RESULTS

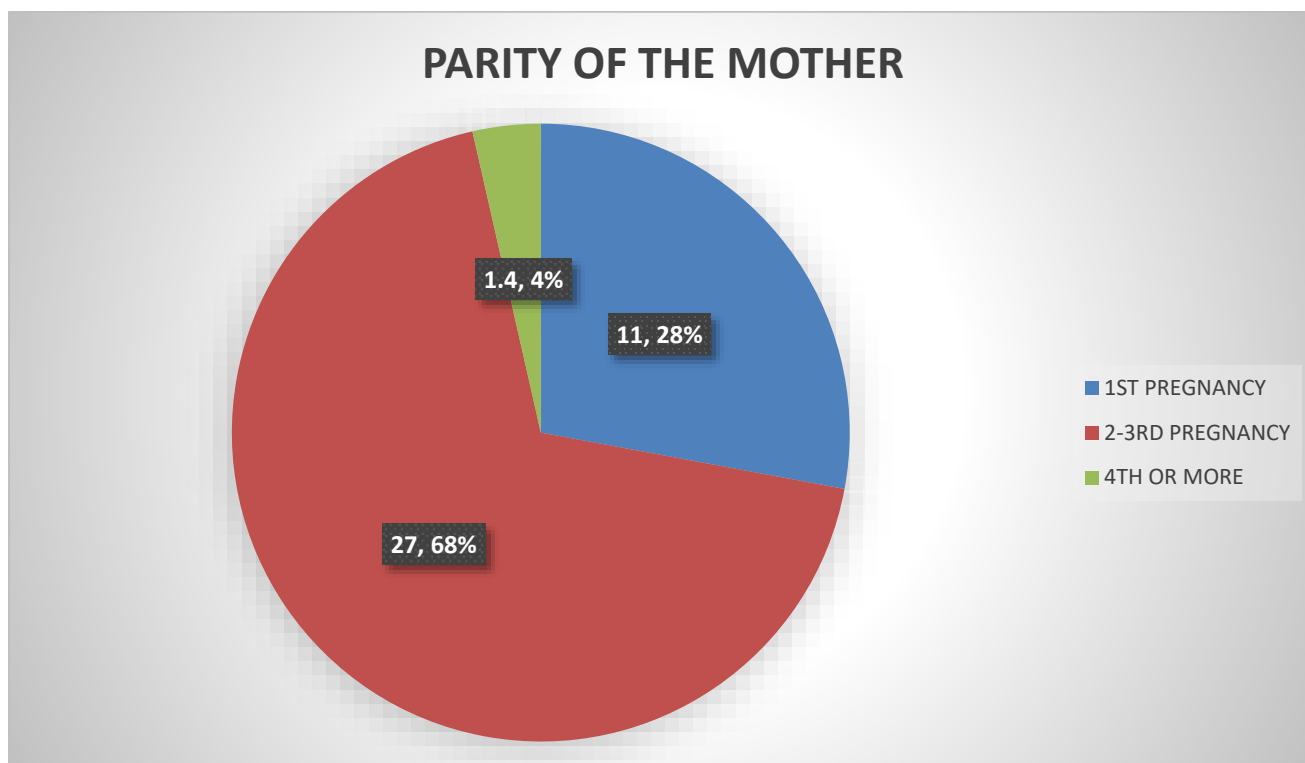
Figure 1: showing the prevalence of malaria in pregnancy (n=246)



From table 1 above, it is showed that prevalence of malaria in pregnancy stands at 42(17.1%)

Parity of the mother.

Figure 2; showing the prevalence of malaria in relation to parity of the mother (n=42)



From the figure 2 above, it is showed that among the 42 pregnant mothers, majority 27(64.3%) of them could get malaria during their second or third pregnancy, 11(26.2%) reported malaria in their first pregnancy whereas those with malaria in their fourth or pregnancies were only four (9.5%).

Table 1: showing socio demographics of pregnant mothers (n=42)

socio demographics		
AGE (YEARS)	Frequency	Percentage (%)
18-25	16	38.1%
26-35	24	57.1%
36-45	2	4.8%
EDUCATION LEVEL		
NO FORMAL EDUCATION	9	21.4%
PRIMARY EDUCATION	20	47.6%
POST PRIMARY	13	31.0%

From the table 1 above, it is indicated that the majority 24(57.1%) of the pregnant mothers who had malaria were between the ages of 26-35 years, 16(38.1%) were between 18-25 years whereas only 2(4.8%) were between 36-45 years. The table further reveals that majority 20(47.6%) of the pregnant mothers who had malaria had only attended primary level of education, 9(21.4%) pregnant mothers had never attended any level of education whereas 13(31.0%) pregnant mothers had gone beyond primary level of education.

Table 2: showing malaria preventive measures among pregnant women(n=42)

Factor	YES/NO	Frequency	Percentage (%)
Mothers sleeping under treated mosquito nets	Yes	19	45.2%
	No	23	54.8%
Mother given IPT	Yes	17	40.5%
	No	25	59.5%

From the table 2 above, it is indicated that among the pregnant mothers who had malaria, majority 23(54.8%) of them were not sleeping under insecticide treated mosquito nets whereas only 19(45.2%) were using mosquito nets.

The table further shows that among the pregnant mothers who had malaria, those who were given IPT were 17(40.5%) and many of them had not been given IPT 25(59.5%).

Table 3: showing adverse outcomes of malaria on both the fetus and the mother (n=42)

ADVERSE OUT COME	FREQUENCY	PERCENTAGE (%)
Preterm delivery	02	4.8%
Low birth weight	06	14.3%
IUFD	None	0%
Abortion	None	0%
Anemia	14	33.3%
Maternal Death	None	0%
IUGR	None	0%
Miscarriage	None	0%
No registered complication	20	47.6%

From the table above, it is indicated that among the pregnant mothers who had malaria, majority 14(33.3%) of them had anemia, those who gave birth to low-birth-weight babies were 6(14.3%). Only 6(14.3%) got pre-term delivery, none of the

pregnant mothers with malaria got either IUGR, Abortion, Miscarriages, IUGR, or died giving birth and those pregnant mothers who registered no complication with malaria were 20(47.6%).

DISCUSSION

The study showed that prevalence of malaria in pregnancy stands at 42(17.1%), this prevalence is high and shows that there is still malaria in areas which serve as a catchment area to KIU teaching hospital, when compared with other studies a study by Fatuma Namusoke et al at Mulago hospital in 2010 on malaria in pregnancy had revealed a prevalence of 20% of malaria among pregnant mothers. The study showed that among the 42 pregnant mothers, majority 27(64.3%) of them could get malaria during their second or third pregnancy, 11(26.2%) reported malaria in their first pregnancy whereas those with malaria in their fourth or pregnancies were only four (9.5%), most of the mothers got malaria during the second trimester, this could be because some pregnant don't attend ANC where they can give preventive therapy against malaria, in comparison with other studies, a study in Khartoum Sudan, by Abdelsafi et al. [31] found out that MiP was associated with gravidity (p-value = 0.002), rural residence (odds ratio RR =3.5, 95% confidence interval CI = 1.6 - 7.8), mosquito breeding sites in the family house (odds ratio RR =5.0, 95% confidence interval CI = 1.2 - 11.7). From the study it is indicated that the majority 24(57.1%) of the pregnant mothers who had malaria were between the ages of 26-35 years, 16(38.1%) were between 18-25 years whereas only 2(4.8%) were between 36-45 years, the majority of the pregnant mothers being between 26-35 years could be because, they have had their initial deliveries and have less experience in pregnancy care, when compared with other studies a study by [32-35] indicated that, among the Sudanese women from Blue Nile State, Malaria in pregnancy was significantly associated with younger age ≤ 23.2 years old (AOR = 3.2, 95% CI 1.9-5.5; $P < 0.001$), and not using bed nets (AOR = 3.5, 95% CI 1.7-6.8; $P < 0.001$). The study further reveals that majority 20(47.6%) of the pregnant mothers who had malaria had only attended primary level of education, 9(21.4%) pregnant mothers had never attended any level of education whereas 13(31.0%) pregnant mothers had gone beyond primary level of education, the study shows that only 31% of mothers had a post primary education, while majority 69% had primary or less educational level, this means the higher the level of education the more equipped a person becomes with better knowledge to prevent malaria, these study results correlate with studies by Worrall, SB et al, 2003 which showed that there is indeed an association between malaria and education levels, pregnant mother who never went to school were 4.2 times more likely to suffer from MIP than those with formal education, it relates to prevention and access to treatment of malaria (). Malaria is endemic in the poorest countries of the world and has often been labeled a disease of poverty. The study indicates that among the pregnant mothers who had malaria, majority 23(54.8%) of them were not sleeping under insecticide treated mosquito nets whereas only 19(45.2%) were using mosquito nets, failure to sleep under treated mosquito exposes one to mosquito bites thus being infected with malaria parasites, a related study by [32-35] and had indicated that not using bed nets exposed mothers to malaria at (AOR = 3.5, 95% CI 1.7-6.8; $P < 0.001$).

CONCLUSION

The study concludes that there is still a high prevalence of malaria in pregnancy at 42(17.1%), of which majority 27(64.3%) of them could get malaria during their second or third pregnancy. The study also concludes that majority 24(57.1%) of the pregnant mothers who had malaria were between the ages of 26-35 years, 16(38.1%) as well as 23(54.8%) of them were not sleeping under insecticide treated mosquito nets. In conclusion also the study, concludes that among the pregnant mothers who had malaria, majority 14(33.3%) of them had anaemia, as well as 14.3% who gave birth to low-birth-weight babies.

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