# PREVALENCE AND RISK FACTORS FOR MALARIA AMONG PREGNANT WOMEN ATTENDING FORT PORTAL REGIONAL REFERRAL HOSPITAL

**BY**

**ANGALA MARIA PASHUKENI**

**BMS/0056/141/DF**

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**ABSTRACT**

Malaria in pregnancy is still a major global, public and reproductive health problem. The pregnant woman is more predisposed to malaria and suffers more adverse consequences compared to the general population. The prevalence of malaria, both in the general population and pregnant women, is still unacceptably high more so in the LMICs of sub-Saharan Africa. The prevalence of malaria in Uganda is high with those more affected being pregnant women and children below the age of five years. To assess the prevalence and risk factors for malaria among pregnant women attending Fort Portal Regional Referral Hospital. It was a descriptive cross sectional study used. The prevalence of malaria in pregnancy was high at 16.27% with factors associated being rural residence low, maternal age, low education, low socioeconomic status, low gravidity and low parity. Increased ownership and used of insecticide treated mosquito net among pregnancy women and strengthen the health education on the reproductive health importance of malaria in all women in their reproductive age. Future study can be done to assess the intervention measures.

Key words: Prevalence, Pregnancy, Gravidity, Parity

**DECLARATION**

I do hereby declare that this research dissertation is the product of my own efforts and to the best of my knowledge, has never been presented to any institution for any award or qualification whatsoever. Wherever the works of other people have been included, due acknowledgement to this has been made in accordance with the appropriate referencing and citations. The findings and the analysis that result from this research project will be my original information.

Researcher: **MARIA PASHUKENI ANGALA, BMS/0056/141/DF**

Signature …….....

Date ……...…. ……

**APPROVAL**

This is to certify that this research dissertation has been prepared under my supervision and has never been presented anywhere for any other purpose and is now ready for submission to the Faculty of Clinical Medicine and Dentistry of Kampala International University for further consideration.

Supervisor: **PROFESSOR EMILIO SANCHEZ, CONSULTANT OBSTETRICIAN & GYNECOLOGIST**

Signed…….

Date……..……

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**LIST OF FIGURES**

**LIST OF TABLES**

## LIST OF ABBREVIATIONS AND ACRONYMS

| | | |
|---|---|---|
| **AIDS** | **:** | Acquired Immunodeficiency virus |
| **ANC** | **:** | Antenatal Care |
| **AOR** | **:** | Adjusted Odds Ratio |
| **CI** | **:** | Confidence Interval |
| **eMTCT** | **:** | Elimination of mother-to-child transmission of HIV |
| **FPRRH** | **:** | Fort Portal Regional Referral Hospital |
| **IPT** | **:** | Intermittent Preventive/Presumptive Treatment of malaria |
| **$IPT_p$** | **:** | Intermittent Preventive/Presumptive Treatment of Malaria |
| **IRS** | **:** | Indoor Residual Spraying |
| **ITNs** | **:** | Insecticide Treated Nets |
| **HIV** | **:** | Human Immunodeficiency Virus |
| **LMICs** | **:** | Low and Middle Income Countries |
| **MDGs** | **:** | Millennium Development Goals |
| **RDT** | **:** | Rapid Diagnostic Test |
| **SDGs** | **:** | Sustainable Development Goals |
| **SP** | **:** | Sufadoxine-Pyremethamine (Fansidar) |
| **WHO** | **:** | World Health Organization |

## OPERATIONAL DEFINITIONS

**Herd Immunity** **:** a form of indirect protection from infectious disease that occurs when a large percentage of a population has become immune to an infection, thereby providing a measure of protection for individuals who are not immune (Gordis, L., 2013)

**Multigravida** **:** a woman that is or has been pregnant for at least a second time

**Parity** **:** the state or fact of having borne offspring. It is the number of times a female has given birth counting multiple births as one and usually including stillbirths. The number of pregnancies reaching 20 weeks and o days of gestation (Merriam Webster, 2017).

## Table of Contents

# CHAPTER ONE: INTRODUCTION

## 1.0 Introduction

Malaria, a life-threatening disease caused by parasites that are transmitted to people through the bites of infected female Anopheles mosquitoes, is still a public health concern especially in at risk groups such as primi-gravid pregnant mothers and children under five years (WHO, 2016).

Going by the global statistics of 2015, about 91 countries had ongoing malaria transmission. This is despite the increased efforts and dramatic reduction in malaria, a preventable and curable disease, in many places (WHO, 2017).

Between 2010 and 2015, the incidence of malaria among populations at risk fell by 21% worldwide. In that same period, malaria mortality rates among populations at risk fell by 29% globally among all age groups, and by 35% among children under 5. In spite of these impressive statistics, it still remains that the African region bears the greatest brunt of Malaria morbidity and mortality. Africa carries a disproportionately high share of the global malaria burden. In 2015, the region was home to 90% of malaria cases and 92% of malaria deaths (WHO, 2017).

Among the special interest groups are pregnant mothers (especially Primi-gravidas) whose increased risk of contracting malaria and the impact of malaria infection on their health and the pregnancy and the impact on public health as a whole necessitated the formulation of The Millennium Development goals (MDGs) of 1990 – 2015 followed by The Sustainable Development Goals (SDGs) of 2016 – 2030. Millennium Development Goal number five ($MDG_5$) set out to improve maternal health and reduce maternal mortality rate. This was to be done in part by the targets set in goal number six ($MDG_6$) that set out to combat HIV/AIDS, malaria and other diseases (United Nations, 2015).

In 2016, all this was blanketed in The Sustainable Development Goal number three ($SDG_3$) that set out to ensure good health and well-being among all by the year 2030 (United Nations General Assembly, 2015)(The United Nations, 2015).

Monitoring of maternal illness such as malaria prevalence is a good indicator tool as to the progress made in an attempt to achieve the set goals as far as the SDGs are concerned. It is for this reason that the study aims to assess the prevalence and risk factors of malaria infection among pregnant women attending antenatal care services (ANC) at Fort Portal Regional Referral Hospital between January and June 2019.

## 1.1 Background

*Plasmodium,* the causative organism for malaria in humans is transmitted through the bites of infected female *Anopheles* mosquitoes. There are five plasmodium species that cause malaria in humans, 2 of which pose the greatest threat. These two species are *P. falciparum* and *P. vivax.*

In the African continent, *P. falciparum* is the most prevalent and it is responsible for most malaria-related deaths globally. *P. vivax* is the dominant malaria causative agent in most countries outside south of Sahara (Lee Goldman, 2016).

Malaria is an acute febrile illness which in non-immune individuals, symptoms usually appear 10–15 days after the infective mosquito bite. Initial symptoms – fever, headache, and chills– may be mild and difficult to recognize as malaria. If not treated within 24 hours, *P. falciparum* malaria can progress to severe illness, often leading to death. In malaria endemic areas, people may develop partial immunity, allowing asymptomatic infections to occur (CDC, 2012).

Everyone is at risk of Malaria. In 2015, almost 50% of the world's population was at risk of malaria. Most malaria cases and deaths occur in sub-Saharan Africa. However, South-East Asia, Latin America and the Middle East are also at risk.

Some population groups are at considerably higher risk of contracting malaria, and developing severe disease, than others. These include infants, children under 5 years of age, pregnant women and patients with HIV/AIDS, as well as non-immune migrants, mobile populations and travelers. National malaria control programmes need to take special measures to protect these population groups from malaria infection, taking into consideration their specific circumstances (CDC, 2012).

Malaria transmission is higher in places where the mosquito lifespan is longer (so that the parasite has time to complete its development inside the mosquito) and where it prefers to bite humans rather than other animals. This long lifespan and strong human-biting habit is seen in the African vector species and is the main reason why nearly 90% of the world's malaria cases are in Africa.

Malaria transmission is also dependent on climate. Climatic conditions may affect the number and survival of mosquitoes e.g. patterns, amounts and duration of rainfall, temperature and humidity.

In many places, transmission is seasonal, with the peak during and just after the rainy season but epidemics can occur when climate and other conditions suddenly favour transmission in areas where people have little or no immunity to malaria. They can also occur when people with low immunity move into areas with intense malaria transmission, for instance for work, or as refugees.

Immunity of the human host is yet another important factor, especially among adults in areas of moderate or intense transmission conditions. Partial immunity is developed over years of exposure, and while it never provides complete protection, it does reduce the risk that malaria infection will cause severe disease. For this reason, most malaria deaths in Africa occur in young children, and newly pregnant mothers whereas in areas with less transmission and low immunity, all age groups are at risk (Kulkarni, Desrochers, & Kerr, 2010).

Vector control is the main way recommended by the World Health Organization (WHO) to prevent and reduce malaria transmission. If coverage of vector control interventions within a specific area is high enough, then a measure of protection will be conferred across the community (herd immunity). This vector control can be carried out in two main forms; insecticide-treated mosquito nets (ITNs) and indoor residual spraying (IRS) which are effective in a wide range of circumstances(Iwuafor et al., 2016).

The prophylactic use of anti-malarials has also been proved effective. Chemoprophylaxis suppresses the blood stage of malaria infections, thereby preventing malaria disease. It is with this knowledge that WHO recommends Intermittent Preventive Treatment (IPT) for pregnant women living in moderate-to-high transmission areas. The chemo-prophylactic agent recommended is sulfadoxine-pyrimethamine (SP), at each scheduled antenatal visit after the first trimester (Iwuafor et al., 2016).

Of recent, insecticide resistance has been reported, particularly in sub-Saharan Africa and India, both malaria endemic regions. This resistance to pyrethroids has been reported in many countries. Pyrethroids are the chemical substances that mosquito nets are impregnated with to achieve more effective evasion of mosquito bites (WHO, 2012). This emphasizes the need for pregnant women to attend antenatal care early and for the full eight visits recommended by WHO so that they can get their routine ANC checkup and be tested, given prophylaxis and treated for malaria whenever the need arises (WHO, 2017). This has also led to the recommendation for increased disease surveillance among at risk groups such as pregnant mothers (WHO Secretariat, 2016). Assessing for prevalence of malaria infection and risk factors among pregnant women is thus one way of doing this surveillance.

## 1.0. Problem Statement

Sub-Saharan Africa bears the greatest burden as far as malaria morbidity and mortality is concerned especially among its most at risk group-the pregnant woman. Malaria in pregnancy has adverse impacts on the health of the pregnant woman and the pregnancy outcome. This is made worse by the unreliable timing of first ANC visit and the number of visits the African woman makes during her pregnancy (Chaponda et al., 2015). The WHO recommends that the pregnant woman be tested and be given IPT for malaria at every subsequent visit after the first visit (WHO, 2012) (WHO, 2017). Assessing malaria prevalence among pregnant women is a key yardstick of measuring progress made as concerns the SDGs, and will also enable early detection and treatment to avoid the complications resulting from malaria in pregnancy. Furthermore, despite the fact that malaria is a preventable and treatable condition among the pregnant women, the prevalence is still high especially in African countries. At FPRRH, efforts to combat malaria in pregnancy, instituted through intermittent malaria screening, and treatment, has seen the prevalence of malaria in pregnancy fall remarkably. By how much, is what is not known since no studies have been conducted to assess the current prevalence of malaria in pregnancy. Knowing the prevalence will enable evaluation of the effectiveness of the current strategy and inform any revamps and changes that might be required. A picture on the risk factors will enable the establishment of factor-specific counter-measures that will combat malaria in pregnancy in a factor-specific manner.

## 1.1. Research Questions

1) What is the prevalence of malaria among pregnant women at Fort Portal Regional Referral Hospital?
2) What are the risk factors of malaria infection among pregnant women at Fort Portal Regional Referral Hospital?

## 1.2. Study Objectives

### 1.2.1. Broad Objective

To assess the prevalence and risk factors for malaria among pregnant women attending Fort Portal Regional Referral Hospital.

### 1.2.2. Specific Objectives

1) To determine the prevalence of malaria among pregnant women at Fort Portal Regional Referral Hospital.
2) To identify the risk factors for malaria infection among pregnant women at Fort Portal Regional Referral Hospital.

## 1.3. Significance of the Study

The principle justification for this study is surveillance as stipulated by "The draft global technical strategy: post 2015" which emphasizes on surveillance of malaria as a tool of completely eradicating the disease (WHO Secretariat, 2016).

The other significance will be to furnish the Management of FPRRH with much needed statistics on malaria prevalence among its pregnant women clientele and the possible risk factors they are exposed to so that to enable decision making, policy formulation and intervention planning. This information will also be useful in influencing decisions by the Uganda Ministry of Health (UMoH). Lastly, the study findings will form basis upon further research on the subject matter or other similar topic can be conducted in the study area.

## 1.4. Study Scope

### 1.4.1. Geographical Scope

The study was conducted at FPRRH in Fort Portal, Kabarole District in Western Uganda. It is a 333-bed capacity hospital with both out-patient, in-patient and private wings. The ANC unit has 3 examination beds and works in collaboration with the eMTCT clinic, ART clinic and immunization clinic. The ANC works 5 days in a week and has 4 midwifes working there headed by a registered midwife. The average number of women attending ANC per day is 45 and the services offered at the clinic include health education, screening for malaria, hypertension, obstetric examination, eMTCT with the baseline laboratory tests offered being HIV screening, syphilis screening, and urinalysis.

### 1.4.2. Content Scope

The study was about assessment of the prevalence and risk factors of malaria infection among pregnant women attending ANC services.

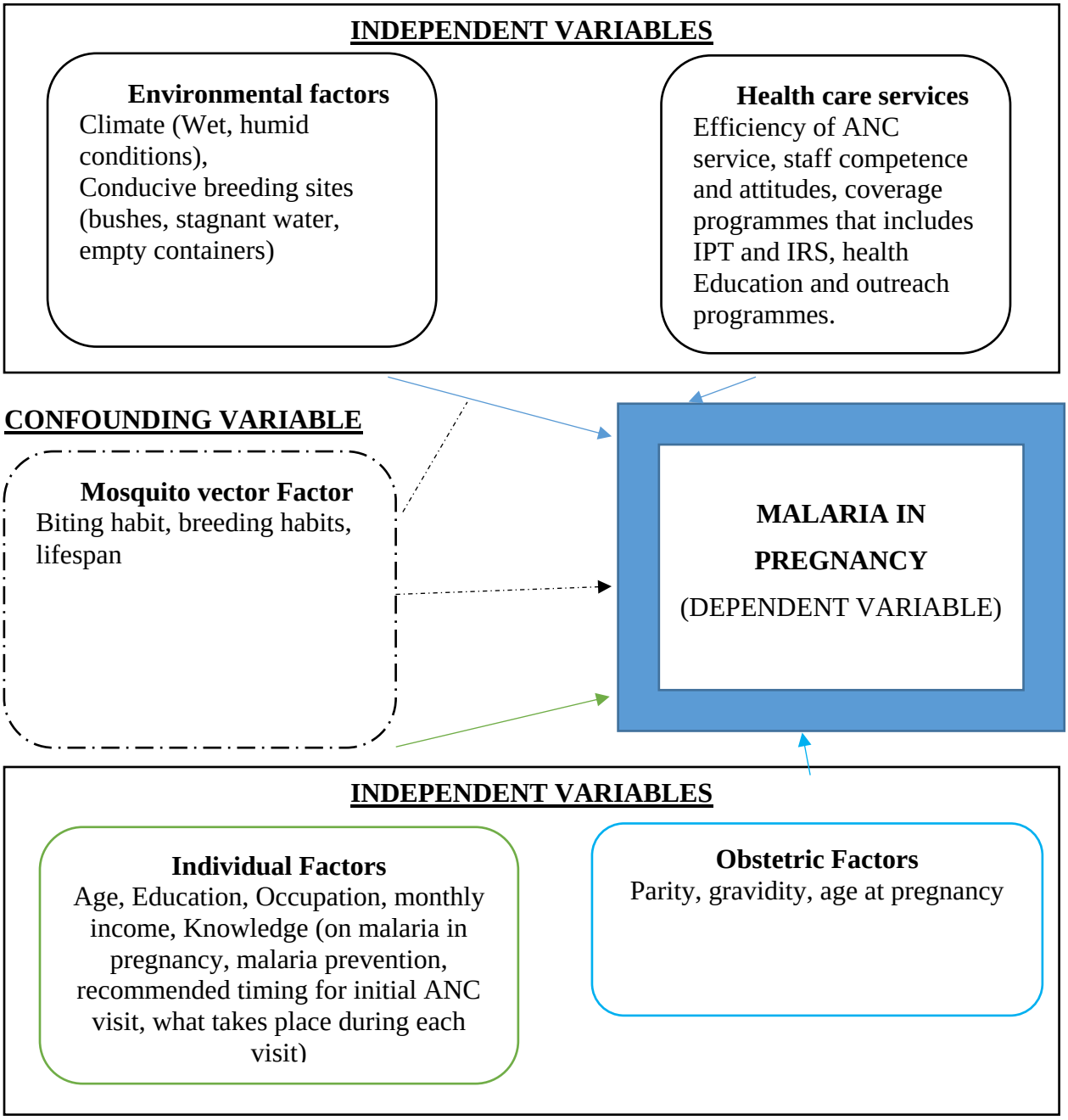
### 1.4.3. Time Scope

The study ran from October 2018 to March 2019, a period of six months.

### 1.5.Conceptual Framework

The independent variables included environmental factors, health care services, individual factors and obstetric factors while the dependent variable was malaria in pregnancy.

*Figure 1: Conceptual Framework on risk factors for malaria occurrence in pregnancy, Adopted from MoH, 2015*



# CHAPTER TWO: LITERATURE REVIEW

## 2.0. Introduction

This chapter dealt with the literature reviewed on the prevalence and risk factors of malaria.

## 2.1. Prevalence of malaria infection among pregnant women attending ANC

Various prevalence studies have been conducted on malaria among pregnant women attending antenatal care clinics.

By microscopy, a study in Papua New Guinea gave a prevalence of 34.4% (113/328) among pregnant women at enrolment for ANC (Stanisic et al., 2015).

In the Amazon of Peru, surveillance demonstrated that pregnant women had a prevalence of clinical malaria of 7.5% in 2010 and 6.6% in 2011 compared with 20.6% and 22.4% of the total population (Parekh, Hernandez, Krogstad, Casapia, & Branch, 2011). These were a bit high compared to result findings in Jharkhand, India in 2015, where the results of a positive diagnostic test for malaria was in 5.4% (68/1271) of the total study population. Blood smears for malaria were positive in 4.3% of pregnant women while an additional 14 (1.1%) women had positive RDTs (Sohail et al., 2015).

These findings were far better than those of a community survey done in a semi-urban community in North-western Nigeria in the same year where 106 (41.6%) out of 255 pregnant women were infected with malaria parasites (Fana, Danladi, Bunza, Anka, & Imam, 2015) and another one done in a tertiary hospital in North-central Nigeria which found a prevalence of malaria parasitaemia of 38.8% of the pregnant women(Ogbu, Aimakhu, Anzaku, Ngwan, & Ogbu, 2015).

In Ed-Duweim Hospital, Khartoum, Sudan, such a study was conducted where blood samples were collected from all pregnant women (118) in their different gestational age of pregnancy who were attending the hospital during one Month. The prevalence of malaria was 38.1%. Majority (97.8%) of these cases were *Plasmodium falciparum* infections (Gabbad, Ahmed, & Elawad, 2014).

Paulo and colleagues in 2012 published their findings from a study in Luanda Angola. During the period of study, 74 (10.9%) out of 679 women were infected by P. falciparum (Campos, Valente, Campos, Gonçalves, & Rosário, 2012) which was almost half the results from in Sanaga-Maritime Cameroon just a year later (22.9%).(Calvin Tonga, Helen Kuokuo Kimbi, Judith Kuoh Anchang-Kimbi & ´ Nyabeyeu Nyabeyeu, Zacharie Bissemou Bissemou, 2013).

At The University Hospital in Kumasi, Ghana, a study in 2013 showed prevalence of malaria parasitaemia among pregnant women to be 12.6% (Tay, Agboli, Abruquah, & Walana, 2013).

In Benna Tsemay District in Ethiopia, the prevalence of malaria among 461 examined study participants was 6.1 % (95 % CI = 4.2, 8.5). The infection rate with *Plasmodium falciparum* and *Plasmodium vivax* was 64.3 % (95 % CI = 45.5, 80.2) and 21.4 % (95 % CI = 19.8, 54. 5), respectively, while mixed infection was 14.3 % (95 % CI = 4.7, 30.9) (Debo & Kassa, 2016).

Back home in Uganda, Namusoke and colleagues in 2010 obtained the following results from Mulago National Referral Hospital. The prevalence by peripheral smear, placental smear, and placental histology was 9 %( 35/391), 11.3% (44/389), and 13.9% (53/382) respectively. Together, smear and histology data yielded an infection rate of 15.5% (59/380) of active infections (Namusoke, Rasti, Kironde, Wahlgren, & Mirembe, 2010). This has improved slightly as evidenced by a study Mutagonda and friends in 2016 where the prevalence of malaria in pregnant women was 8.1 % (95 % CI 6.85–9.35) of whom 3.4 % (95 % CI 1.49–8.51) had severe malaria (Mutagonda et al., 2016).

**2.2. Risk factors for Malaria Infection in Pregnancy**

Pregnant women are particularly vulnerable to malaria as pregnancy reduces a woman's immunity to malaria, making her more susceptible to malaria infection and increasing the risk of illness, severe anemia and death (WHO, 2017). For this reason, a pregnant woman needs to be protected against infection through vector control, barrier prevention and chemoprophylaxis.

So many factors ranging from those associated to the pregnancy to socio-demographic and environmental factors put the pregnant woman more at risk.

In Ed-Duweim Hospital in Sudan, increase in Malaria infection among pregnant women was associated with gravidity (p-value = 0.002), rural residence (odds ratio RR =3.5, 95% confidence interval CI = 1.6 - 7.8), lack of knowledge on malaria (odds ratio RR =22.4, 95% confidence interval CI = 7.5 – 66.6) and mosquito breeding sites in the family house (odds ratio RR =5.0, 95% confidence interval CI = 1.2 – 11.7) (Gabbad et al., 2014).

In Burkina Faso, a strong association was made between parity, genetic factors and malaria prevalence in pregnancy. It was seen that the prevalence of malaria was high among primi-gravidas and went down with increasing parity. And among pregnant women it was higher compared to the general population (M. Cot, L. Abel, A. Roisin, D. Barroa. Yada, P. Carnavale, 2010).

In North-western Nigeria, age was found to have a negative correlation with malaria prevalence i.e. the prevalence fell increase in age (Fana et al., 2015). Still in Nigeria, but now in the Central-Northern parts, primigravidity, young age, low level of education were associated with high

malaria prevalence among pregnant women (Ogbu et al., 2015).The Probability of a woman aged<30 years having malaria parasitaemia was four times (81.3%) more than those aged>31 years (18.8%).

Lower monthly income and young age were found to be of significance in increasing malaria prevalence among pregnant women in Sanaga-Maritime, Cameroon.

Attendance at antenatal clinic and level of education significantly influenced the utilization of IPTp-SP (p,0.0001 and p=0.018 respectively). Use of SP and mosquito net resulted in improved pregnancy outcome especially in primiparous, though the difference was not significant (Calvin Tonga, Helen Kuokuo Kimbi, Judith Kuoh Anchang-Kimbi & ´ Nyabeyeu Nyabeyeu, Zacharie Bissemou Bissemou, 2013).

In the pastoral communities of Benna Tsemay, Southern Ethiopia, pregnancy (adjusted Odds Ratio [AOR]: 12.6, 95 % CI = 1.7, 94.7) and saving mosquito net for later use (AOR 9.6: 95 % CI = 2.2, 42.8) were independently associated with prevalent malaria infection (Debo & Kassa, 2016).

In Mulago Hospital, Kampala, Uganda lower parity, lower gravidity (primis, gravida 2 and gravida 3) and the lack of use of ITNs was associated with increased prevalence of malaria among pregnant women (Namusoke et al., 2010).

# CHAPTER THREE: METHODOLOGY

## 3.0.Introduction

This chapter describes the study area focusing on population structure and many other aspects including study design, sample size determination, sampling method, selection criteria, data Collection, data analysis, data presentation, data quality control, study limitation and Ethical consideration.

## 3.1. Study Design

Descriptive cross sectional study was used.

## 3.2. Study Population

All pregnant women attending ANC services at Fort Portal Regional Referral Hospital.

### 3.2.1. Inclusion Criteria

Pregnant women attending Fort Portal Regional Referral Hospital ANC unit during the study period who offered consent were allowed to participate in the study.

### 3.2.2. Exclusion Criteria

All those who were pregnant and who visited Fort Portal Regional Referral Hospital ANC unit at the time of the study but who refused to offer consent were excluded.

## 3.3. Sample Size Determination

The sample size was determined using Fishers et al., 2006 formula i.e. $N=Z^2PQ/D^2$:

Where;

N is the desired sample size

Z is the standard normal deviation taken as 1.96 at a confidence interval of 95%.

P is the prevalence of Malaria among pregnant women = 8.1% (estimated from Uganda study by Mutagonda et al, 2016)

D is the degree of accuracy= 0.05.

Q= (1-P) which is the population without the desired characteristics.

Therefore, $N= 1.96^2 \text{ X } 0.081 (1-0.081) / (0.05)^2 = 114$ will be the sample size.

## 3.4. Sampling Technique

Consecutive sampling technique was used for the study. Researcher selected study participants as they come to the ANC unit. This was after total estimates of attendance were obtained from records so as to enable get an estimate of the sampling interval.

### 3.5. Data Collection Method

Was done by the use of a questionnaire that had been specifically tailored with questions on socio-demographic data, obstetric history, ANC visits and utilization, and possible risk factors that the pregnant woman might be exposed. Additional data was obtained from RDT results and blood smear for malaria parasites that is normally done for pregnant women attending ANC.

### 3.6. Data collection tools and Procedure

Researcher-administered questionnaire was used to conduct this study. More information was obtained from lab reports on malaria diagnosis.

### 3.7. Quality Control

Patient demographic data and bio data was counterchecked by asking the patient. Researcher ensured that they followed-up blood samples to obtain the results. The questionnaire was pre-tested before the main study and 2 research assistants fluent in both English and the local lingua were recruited and adequately trained.

### 3.8. Data Analysis

Each questionnaire was checked and verified for completeness, missing values and unclear responses and then manually cleaned up on such indications. Data was exported to SPSS version 17. Using double entry, the data was cross checked for consistency and accuracy. Responses and observations given points and tallied then recorded to obtain means then presented in graphs, charts and tables.

### 3.9. Ethical Considerations

Clearance was obtained from Kampala International University-Western Campus faculty of clinical medicine & dentistry through IREC. Informed consent from the respondents was sought both verbally and in writing. Participants were assured of confidentiality and use of the information obtained only for the purpose of the research. Participation was fully out of the respondents' choice with the right to pull out at any time, whenever they no longer felt comfortable to continue. Their participation, or its lack thereof, did not in any way influence any condition-related services they were already getting or were bound to get at any time from the Hospital or staff involved but those that were found to have malaria appropriate treatment was immediately commenced.

# CHAPTER FOUR: FINDINGS

## 4.0. Introduction

This chapter presents the study findings as per objective in the form of narratives, tables, graphs and charts. During the 6-month study period, a total of 3,467 pregnant mothers attended ANC out of whom 564 tested positive for malaria.

## 4.1. Prevalence of Malaria in Pregnancy

During the 6-month study period, a total of 3,467 pregnant mothers attended ANC out of whom 564 tested positive for malaria. This gave a malaria prevalence among the pregnant women of 16.27%.

## 4.2. Factors associated with Malaria in Pregnancy

### 4.2.1. Age of the Mother

| Age Cluster (YRS) | Frequency (N) | Percentage (%) |
|---|---|---|
| 15 – 19 | 140 | 24.82 |
| 20 – 24 | 192 | 32.27 |
| 25 - 29 | 201 | 35.64 |
| 30 - 34 | 89 | 15.78 |
| 35 and above | 42 | 7.45 |
| **Total** | **564** | **100** |

*Table 1: Maternal Age and Prevalence of Malaria in Pregnancy (N=564)*

Age lower than 25 years (57.09%) was associated with high malaria cases in pregnancy. The highest prevalence, though, was recorded in the 25 – 29 age group (35.64%), followed by 20 – 24 age group (32.27%).

### 4.2.2. Gravidity / Parity

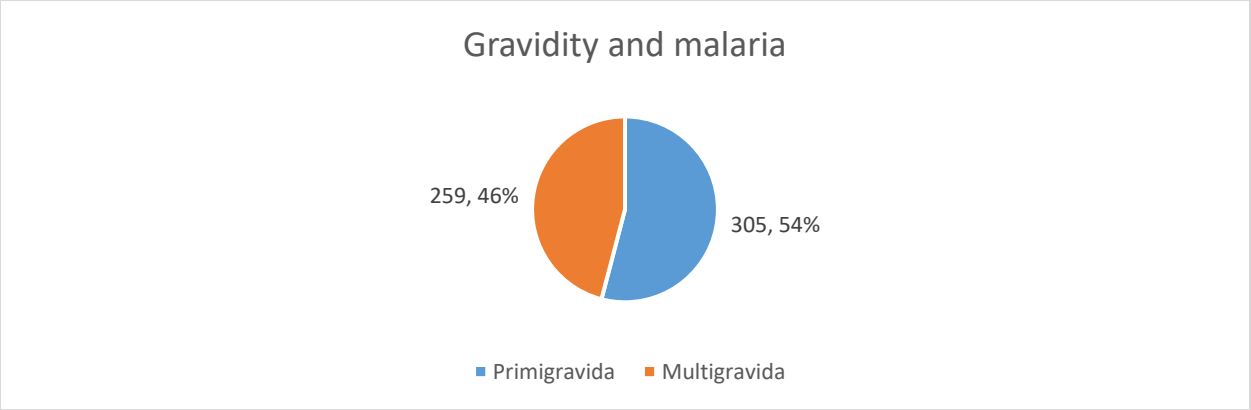



*Figure 2: Gravidity and Prevalence of Malaria in Pregnancy (N=564)*

Malaria was more among primigravida women compared to multigravida. 305 (54%) primigravidas were diagnosed with malaria compared to 259 (46%) multigravidas.

### 4.2.3. Residence, daily expenditure & Education level of Mother

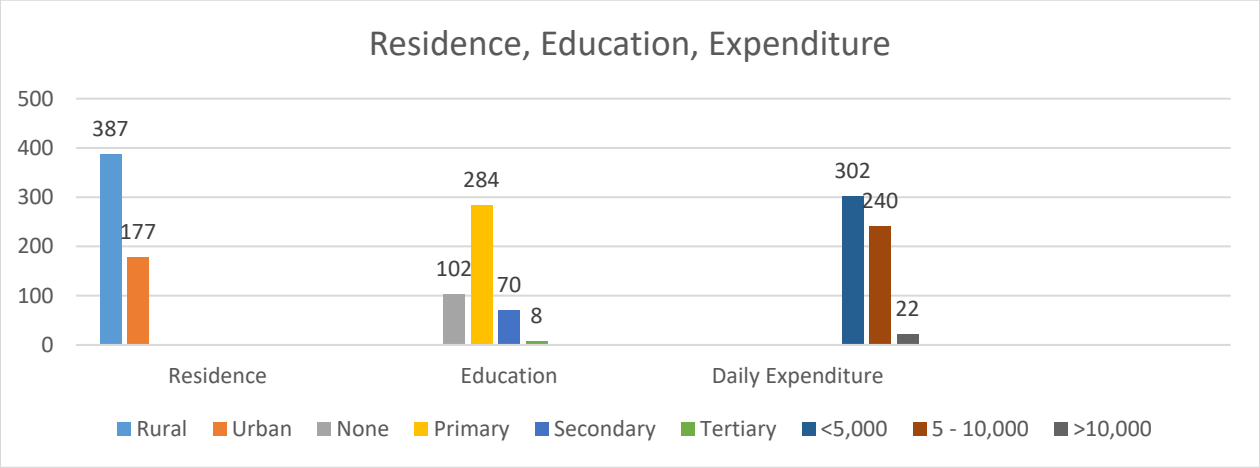



*Figure 3: Residence, Education & Daily Expenditure & the Prevalence of Malaria in Pregnancy (N=564)*

387 (68.62%) of the pregnant women came from rural areas whereas 177 (31.38%) came from urban areas. Most of them had an education level of primary and below. Those with primary level were 50.36%, followed by those with no formal education (18.09%), secondary (12.41%) and lastly tertiary (1.42%). On daily expenditure, majority lived below the dollar line! 53.55% spent less than 5,000 Uganda shillings, 42.55% spent between 5,000 and 10,000 while only 3.90% spent more than 10,000 daily.

### 4.2.4. Knowledge and Practice Concerning Malaria

All the women had adequate knowledge concerning malaria, transmission and prevention, but all had some had some predisposition to being infected with malaria given the fact that they all agreed to completely eradicating mosquito breeding sites around their homes. Some had bodies of stagnant water around, empty cans and containers, bushes among others. Their use of insecticide treated mosquito nets was also below per as shown in figure 4 below.

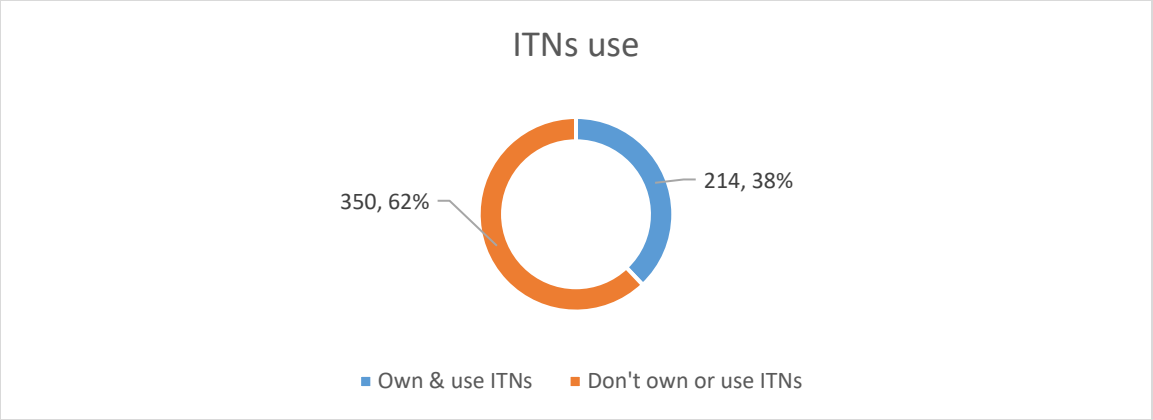



*Figure 4: Ownership and Use of ITNs among Pregnant Mothers with Malaria*

As shown in Figure 4 above, the pregnant mother's use of ITNs was unsatisfactory hence their increased risk of contracting malaria. Only 214 (38%) affirmed ownership and regular use of ITNs.

# CHAPTER FIVE: DISCUSSIONS, CONCLUSIONS AND RECOMMENDATIONS

## 5.0.Introduction

This chapter deals with the discussion of the study results by objective and conclusions derived from these findings plus the recommendations made.

## 5.1. Discussions on the Prevalence & Risks of Malaria in Pregnancy

The prevalence of malaria in pregnancy was 16.27% seen more in primigravidas (54%) from rural areas (68.62%), living below the dollar line (53.55%), with a low education level (68.45%) and who did not own or use insecticide treated nets (62%).

### 5.1.1. Prevalence of Malaria in Pregnancy

The prevalence of 16.275 was lower than that in Papua New Guinea of 34.4% reported by (Stanisic et al., 2015). This could be attributable to the climate differences between Papua New Guinea and Uganda. Papua New Guinea is known for its rainfall, monsoons and temperatures ranging from 23 degrees in the higher mountain regions and 28 degrees in the coastal plains. These warm and wet conditions favor mosquito breeding hence the prevalence rates of Plasmodium falciparum malaria as high as 65% reported. It could also be attributed to the high incidence of drug resistant P. falciparum malaria reported Papua New Guinea (Mitjà et al., 2013). A tropical climate alone, however, does not entirely explain high malaria prevalence. Other factors such as drug resistant strains also have a big role to play (Mitjà et al., 2013). This fact is supported by the report from the Amazon of Peru where the prevalence was as low as 6.6% (Parekh et al., 2011) despite it being as warm and wet as Papua New Guinea.

The fact that this study's values were higher than the 4.3% found in India by (Sohail et al., 2015) is attributable to, among other reasons, the population differences between the two regions. Also, the pharmaceutical advancement seen in India compared to Uganda (Raja, Raj, Babu, Vardhan, & Reddy, 2012). India manufacture a wide range of drugs, anti-malarials included, that its populace can access easily and cheaply. The aspect of population size was seen again in Nigeria which reported high values too. Values as high as 38.8% (Ogbu et al., 2015) and 41.6% (Fana et al., 2015) in this populous country in Africa.

Of more importance, though, is the fact that this study's values are higher than the 8.1% reported by (Mutagonda et al., 2016) I Mulago. This difference could be linked to the differences that exist within the catchment areas of the two health facilities; Mulago is in Kampala, Central Uganda and

a more urban setup compared to those served by FPRRH where the people are mainly banana farming rural folk. The vegetation and banana plantations offer breeding sites for mosquitoes.

### 5.1.2. Risk Factors for Malaria in Pregnancy

Just like in (Gabbad et al., 2014)'s study in Ed-Duwein Hospital in Sudan, gravidity, rural residence, lack of knowledge on malaria and presence of mosquito breeding sites around the family house were significant risk factors in this study. Gravidity was also reported significant in a study conducted by (Carnavale, et al., 2010) I Burkina Faso.

On the negative correlation between increasing age and malaria prevalence seen in this study was also reported by (Fana et al., 2015) in Nigeria where also primigravidity, young age and low maternal education were associated with a high prevalence of malaria in pregnancy (Ogbu et al., 2015).

Low monthly income, and by extension low daily expenditure, together with low maternal age were also reported by (Calvin Tonga, Helen Kuokuo Kimbi, Judith Kuoh Anchang-Kimbi & ´ Nyabeyeu Nyabeyeu, Zacharie Bissemou Bissemou, 2013) in Cameroon. In Benna Tsemay, Southern Ethiopia, lack of use of ITNs was the most significant risk factor (Debo & Kassa, 2016). Back in Mulago, Uganda, low parity, low gravidity and lack of use of ITNs were also associated with high malaria in pregnancy (Namusoke et al., 2010).

## 5.2. Conclusions

The prevalence of malaria in pregnancy was high at 16.27%, a value that demands urgent intervention.

The factors associated with high prevalence of malaria in pregnancy include rural residence, low gravidity/parity, low maternal age, low education level of the mother, low socioeconomic status, presence of mosquito breeding sites around the house with lack of use of ITNs.

## 5.3. Recommendations

### 5.3.1. To the Pregnant Mothers

Increase ownership and use of insecticide treated mosquito nets together with eradication of mosquito breeding sites such as bushes, stagnant waters and water-holding containers.

### 5.3.2. To the Staff and Administration of FPRRH

Revamp education on the reproductive health importance of malaria in pregnancy and the impact malaria has on the pregnant mother and its outcomes. Provide and encourage proper use of insecticide treated mosquito nets for all pregnant women and their children.

### 5.3.3. To fellow Researchers

This study dwelt mainly on the prevalence and socio-demographic factors associated with malaria in pregnancy. Further studies can be done on the severity and outcomes of untreated malaria in pregnancy. Another study that can be done would be an interventional study that would aim to assess the impact of interventions such as health education on malaria, widespread distribution of ITNs and education on their proper and regular use, clearing of mosquito breeding sites on the prevalence of malaria in pregnancy.

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## APPENDICES

## APPENDIX ONE: CONSENT FORM

**STUDY TITLE:** PREVALENCE AND SOCIODEMOGRAPHIC RISK FACTORS FOR MALARIA AMONG PREGNANT WOMEN ATTENDING FORT PORTAL REGIONAL REFERRAL HOSPITAL.

I have read and understood the research topic above on the planned study and the explanations given to me. I understand what I have been requested to do in respect to this study. I have asked questions and gotten clarifications about the study and I am satisfied. I have, after due consideration, willingly consented to take part in this study as explained.

Participant's signature …… Date ……...

Investigators name …… Signature ……

Date ……

## APPENDIX TWO: APPENDIX TWO: DATA COLLECTION TOOL

## STUDY QUESTIONNAIRE

**SERIAL NO: …….**

**INTRODUCTION**

**STUDY TITLE:** PREVALENCE AND SOCIODEMOGRAPHIC RISK FACTORS FOR MALARIA AMONG PREGNANT WOMEN ATTENDING FORT PORTAL REGIONAL REFERRAL HOSPITAL.

**CONFIDENTIALITY:** I am **Maria Pashukeni Angala**, a final year medical student at Kampala International University – Western Campus carrying out the above research. I would hereby wish to assure you that the information you will provide will be accorded the confidentiality it deserves and will not be used for purposes other than those meant for this research. Therefore, feel free.

**DEMOGRAPHIC DATA**

AGE ……

RELIGION (Name appropriate) ……..……

MARITAL STATUS
SINGLE ☐ DIVORCED ☐
MARRIED ☐ WIDOWED ☐

EDUCATION STATUS
NO FORMAL EDUCATION ☐
PRIMARY ☐
SECONDARY ☐
POST SECONDARY ☐

EDUCATION STATUS OF PARTNER (If applicable)
NO FORMAL EDUCATION ☐
PRIMARY ☐
SECONDARY ☐
POST SECONDARY ☐

OCCUPATION ……

OCCUPATION OF PARTNER (If applicable) ……...

PLACE OF RESIDENCE ……

DAILY EXPENDITURE ON FOOD
LESS THAN 5,000 UGX ☐
5,000 – 10,000 UGX ☐
MORE THAN 10,000 UGX ☐

## MAIN SECTION

1. Obstetric Factors
   a) Gravidity …….
   b) Parity ……
2. Knowledge concerning malaria
   a) How is malaria transmitted? ……...
   b) What are the signs/symptoms that a person has malaria? ……..
      …….
   c) Is there a specific season of the year that cases of malaria increase in the community?

      YES ☐ NO ☐

      If yes to (2b), when?
   d) What can be done to prevent one from getting infected with malaria? (tick as many as mentioned).
      i. Clearing bushes around the compound ☐
      ii. Draining stagnant water ☐
      iii. Removal of empty containers and cans ☐
      iv. Sleeping under a mosquito net (treated or untreated) ☐
      v. During outbreaks, taking anti-malarials as prophylaxis ☐
      vi. Others (specify) …….
   e) Do you and your family own an ITN? YES ☐ NO ☐
   f) Do you regularly sleep under an ITN? YES ☐ NO ☐
   g) Do you have possible mosquito-breeding sites around the house e.g. bushes, stagnant water etc. YES ☐ NO ☐
   h) Is this your first visit in this pregnancy? YES ☐ NO ☐

      If no,
      i. What number of visit is it? ……..…….…….
      ii. When was your first visit? ……..……....
      iii. At what gestational age of pregnancy were you when you attended ANC for the first time in this pregnancy? ……..……
      iv. At what age of pregnancy is it recommended for a pregnant woman to attend ANC for her first visit? …….

v. How many visits in total is a pregnant woman advised to attend ANC in her entire pregnancy? …….

vi. Do you know which services a pregnant woman should receive in each visit? ……..

vii. Can you recall which services you received during your former visits?

YES ☐ NO ☐

If yes to (vii) above, please describe them for me …….

……

……

……

3. Health care services Factors

a) Do you receive health education and talks during your visits to ANC? ……

If yes to 3a above, please describe in brief what have been taught to you this far?

……

……

……

……

b) Have you ever had the health care providers come to your locality for health outreaches?

……

If yes to 3b above, can you recall what went on during these outreaches?

……

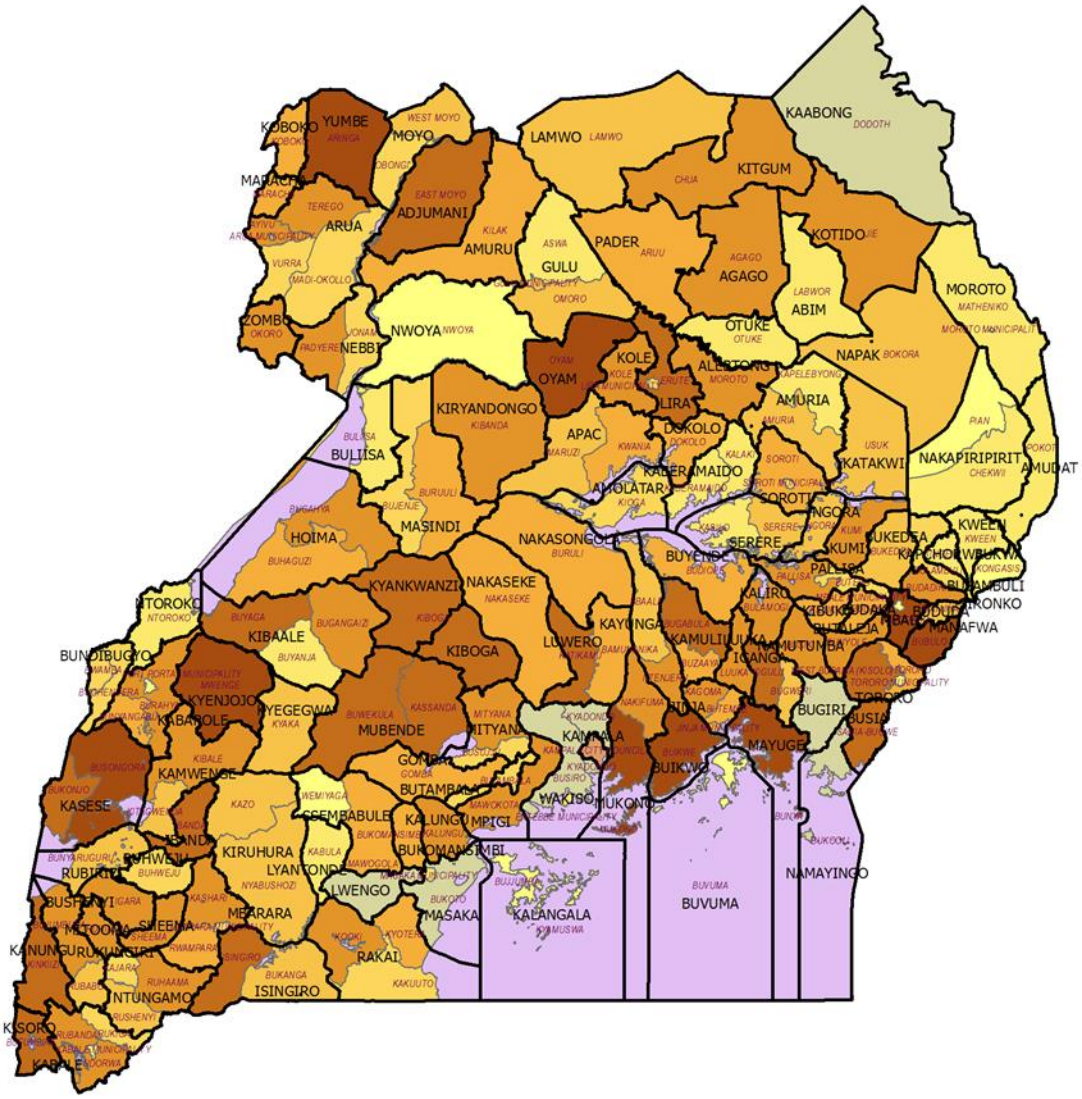
……

*Is there anything else you want to add, ask, clarify? Otherwise,*

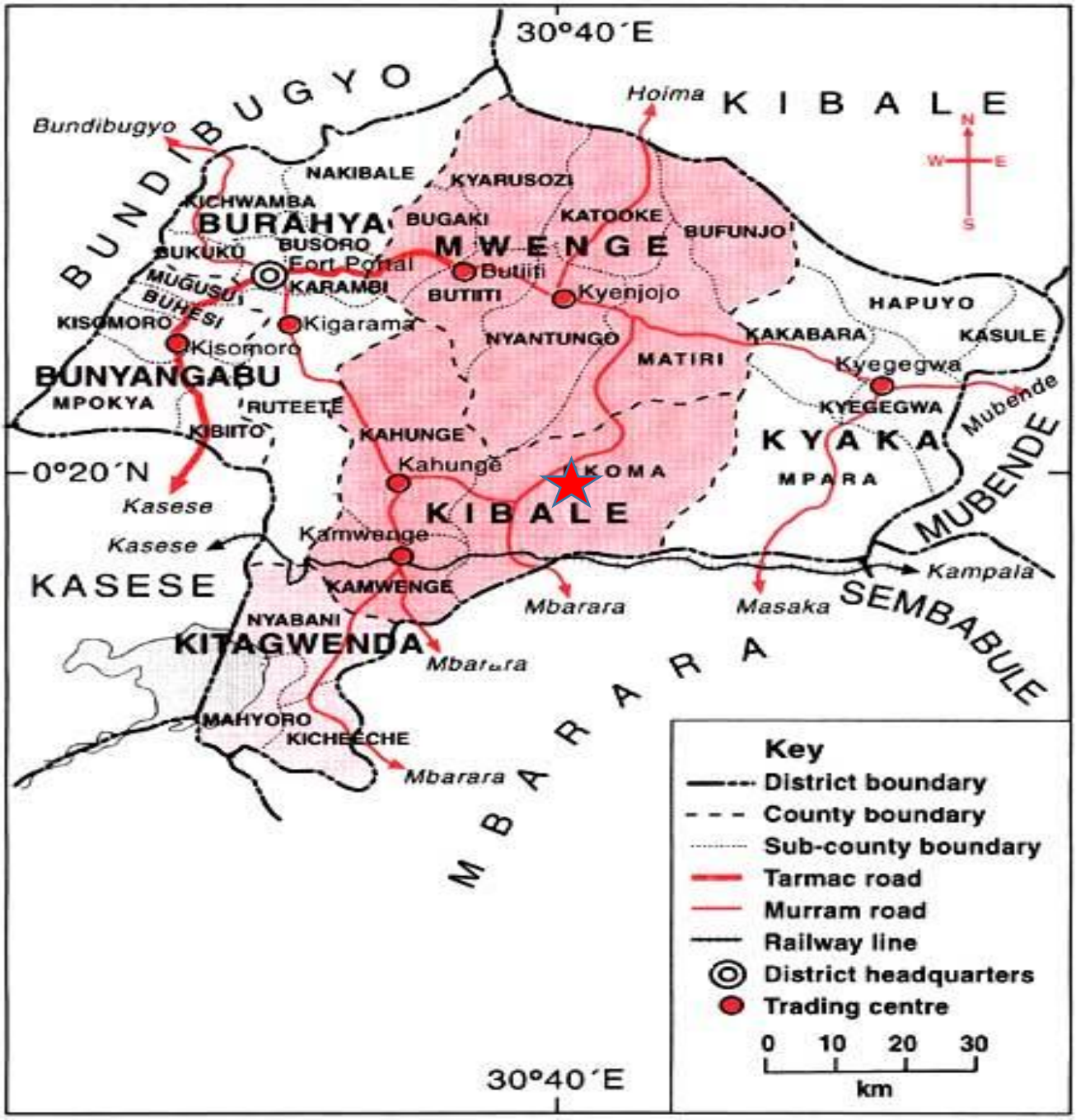
*THANK YOU*

## APPENDIX THREE: BUDGET

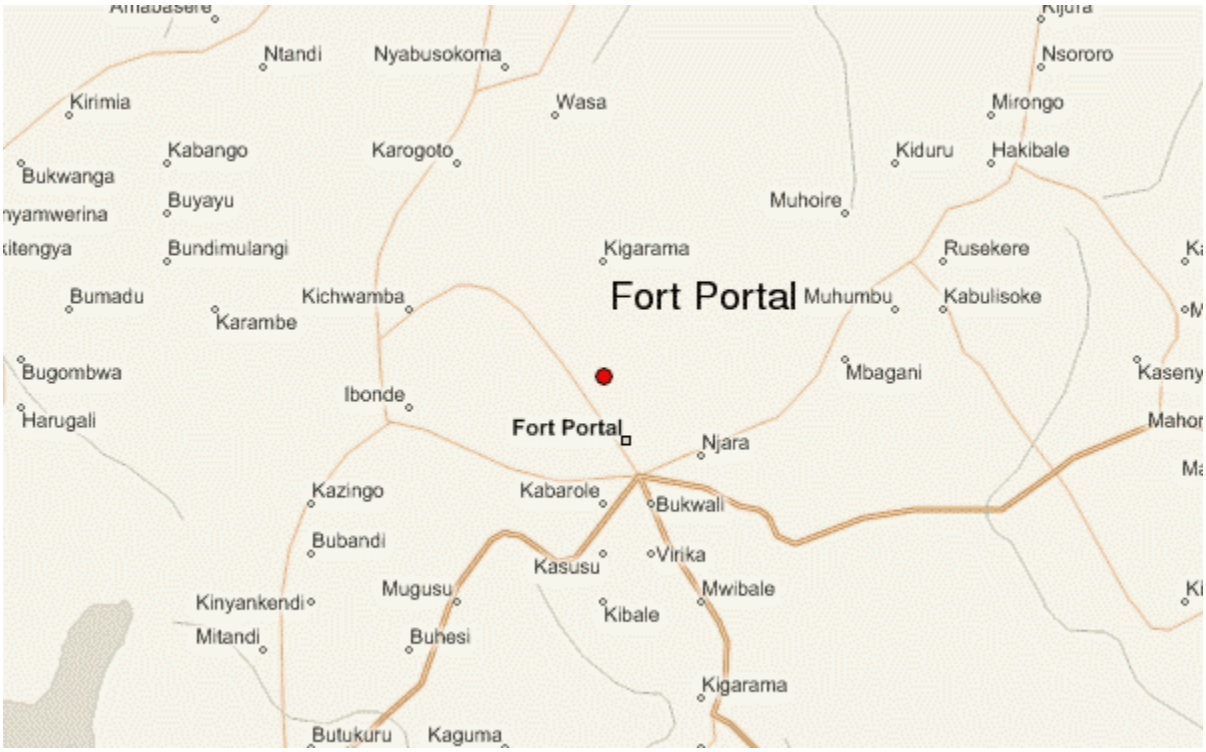
## APPENDIX FOUR: MAP OF UGANDA SHOWING THE VARIOUS DISTRICTS



**APPENDIX FOUR: MAP OF KABAROLE DISTRICT UGANDA**



## APPENDIX FIVE: MAP OF FORT PORTAL IN KABAROLE DISTRICT



## APPENDIX SIX: APPROVAL LETTER FROM IREC, KIU

KAMPALA INTERNATIONAL UNIVERSITY – WESTERN CAMPUS

P O BOX 71, ISHAKA UGANDA
Tel: +256 200923534
www.kiu.ac.ug

OFFICE OF THE DEAN
FACULTY OF CLINICAL MEDICINE & DENTISTRY

25/02/2019

TO WHOM IT MAY CONCERN

I No objection
be Abirulekwa Lawrence to supervise and provide guidance

Dear Sir/Madam,

**RE: MARIA PASHUKENI ANGALA (BMS/0056/141/DF)**

The above named person is a fifth year student at Kampala International University pursuing a Bachelor of Medicine, Bachelor of Surgery (MBChB) Programme.

She wishes to conduct her student research in your hospital.

**Topic:** Prevalence and risk of malaria among pregnant women attending Fort Portal Regional Referral Hospital

**Supervisor**: Dr. Abirulekwa Lawrence

Any assistance given will be appreciated.

K.I.U TEACHING HOSPITAL
25 FEB 2019
W.Campus
ASSOCIATE DEAN FCM&D

Yours Sincerely,

S. O. Akb

**Dr. Akib Surat**
**Deputy Executive Director/Assoc Dean FCM&D**