KAMPALA INTERNATIONAL UNIVERSITY

WESTERN CAMPUS

PREVALENCE AND RISK FACTORS ASSOCIATED WITH MALARIA AMONG PREGNANT WOMEN PRESENTING AT SAINT KIZITO HOSPITAL MATANY

BY

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DECLARATION

I, Iriama Moses, a student of the faculty of clinical medicine and dentistry, Kampala International University Western Campus, do hereby declare that this research is my personal original work and has not been reproduced from other studies done and not presented for an award of Bachelor in Medicine and Bachelor in Surgery in any institution

…… ……

Iriama Moses **Date**

DEDICATION

I dedicate this research to my dear wife and the children for their support, patience, and encouragement throughout the entire course and to my dear parents, sisters and brothers for their love and encouragement.

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CERTIFICATION

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ABBREVIATIONS

WHO: World Health Organization

HIV: Human Immune Virus

SP: Sulphadoxine Pyrimethamine

MoH: Ministry of Health

IPT: Intermittent Preventive Treatment

ITN: Insect Treated Nets

IRS: Indoor Residual Spraying

GI: Gastrointestinal

CNS: Central Nervous System

RBC: Red Blood Cell

LBW: Low Birth Weight

IM: Infant Mortality

IUGR: Intrauterine Growth Retardation

QBC: Quantitative Buffy Coat

PBS: Peripheral Blood Smear

RDT: Rapid Diagnostic Test

PCR: Polymerase Chain Reaction

GDP: Gross Domestic Product

ACT: Antenatal Care

ACT: Artemisinin Combined Treatment

ANC: Antenatal Care

ABSTRACT

INTRODUCTION: 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 control malaria.

OBJECTIVE: The study was conducted to find out the prevalence and risk factors associated with malaria amongst pregnant women who presented from July 2013 to July 2014.

METHOD: The study design was a retrospective and descriptive survey carried out at Matany Hospital. Data was obtained from the hospital records from July 2013 to July 2014.

RESULTS: The total number of admissions was 1861. A total of 213 cases had malaria in pregnancy out of 1861 admissions.

The prevalence of malaria in pregnancy was 11.4%. Most of the mothers diagnosed with malaria were between the ages of 15 to 24 years while those 35 years and above were list affected. Age bracket of 15 to 24 had 112 mothers with malaria; 25 to 34 had 68 mothers, the second highest; and 35 and above had 02 mothers.

Primigravidae had the majority of cases of malaria,68, with a percentage of 32% and the number of cases decreased with increase in gravidity.

CONCLUSION: malaria is one of the leading causes of hospital admissions in Matany Hospital and it is associated with many complications including anemia and threatening abortion.

CHAPTER ONE

1.1-BACKGROUND

Malaria, a parasitic infection transmitted by mosquitoes, is one of the most devastating infectious diseases, killing more than 1 million people annually, pregnant women, children and immunocompromized individuals have the highest morbidity and mortality, and Africa bears the heaviest burden(Malaria Facts, 2009),(The Global Fund, malaria, August 1,2009).

The World Health Organization defines malaria as a disease of poverty caused by poverty. Pregnant women infected with malaria usually have more severe symptoms and outcomes, with higher rates of miscarriages, intrauterine demise, premature delivery, low-birth-weight neonates, and neonatal death. They are also at a higher risk for severe anemia and maternal death (The Global Fund, malaria, August. 1. 2009)

Malaria is the second most common cause of infectious disease-related death in the World, after tuberculosis. It is estimated to affect between 350 to 500 million people annually and accounts for 1 to 3 million deaths per year, Sub-Saharan Africa has the largest burden of malarial disease, with over 90% of the worlds malaria related deaths occurring in this region. Twenty-five million pregnant women are currently at risk for malaria, and, according to the world Health Organization (WHO), malaria accounts for over 10,000 maternal and 200,000 neonatal deaths per year (Malaria Facts. August 1. 2009),(The Global Fund,malaria, August 1, 2009.)

As funding increases to combat both malaria and maternal mortality, understanding how malaria significantly affects pregnant women is crucial in our efforts to improve maternal and perinatal health and curb the spread of this preventable disease (Global Health perspective).

Pregnant women are 3 times more likely to suffer from disease as a result of malaria infection compared with their non pregnant counter parts, and have a mortality rate that approaches 50% (Guideline for treatment of malaria. WHO, 2006). In areas endemic for malaria, it is estimated that at least 25% of pregnant women are infected with malaria, with the highest risk for infection and morbidity in primigravidas, adolescents, and those co infected with HIV (Desai M, et al. Lancet Infect Dis. 2007). The second trimester appears to bring the highest rate of infection,

supporting the need for ante partum care as part of malarial prevention and treatment efforts (Global Health Perspective).

Global Health Perspective

Malaria infection during pregnancy is a significant health problem with substantial risks for the pregnant woman and her fetus, and the new born. Malaria- associated maternal illness and low birth weight is mostly the result of plasmodium falciparum infection and occurs predominantly in Africa. The symptoms and compilations of malaria in pregnancy vary according to malaria transmission intensity in the given geographical area, and the individual's level of acquired immunity. In high- transmission settings, where levels of acquired immunity tend to be high, p.falciparum infection is usually asymptomatic in pregnancy. Yet, parasites may be present in the placenta and contribute to maternal anemia even in the absence of documented peripheral parasitaemia (Global Health perspective).

Although all pregnant women may be at risk of malaria, its complications are greatest in those with modified immunity such as primigravidae, secundigravidae, adolescents, immigrants from non-endemic areas and those infected with HIV.

The National malaria control program is committed to controlling malaria in pregnancy through minimum health care package outlined in the malaria in pregnancy control strategic plan. The three key components of the strategy are: Intermittent Preventive treatment (IPT), early diagnosis and prompt case management, and consistent insecticide treated net use for expectant mothers before, during and after pregnancy (Julianna schantz-Dunn, Malaria and Pregnancy: A Global Health Perspective).

In Uganda, malaria accounts for 25%-40% of out patient's attendances, 20% of all admissions and 14% of all in-patient deaths. Because of the impact malaria has on morbidity and mortality in Uganda, effective malaria treatment is a top priority of the Ministry of Health. Early diagnosis

and prompt treatment of malaria cases are important to effective malaria case management. The National Anti-Malaria policy stresses the importance of recognizing symptoms of malaria and treating within 24 hours after the onset of symptoms or a positive malaria test to prevent the development of severe and complicated malaria (Ministry of Health Uganda).

The Ministry of Health emphasizes the importance of effective malaria case management for everyone and particularly for children under 5 and pregnant women who are more at risk of complications of malaria. Today, Uganda faces new challenges for malaria treatment because of increasing resistance of malaria parasites to chloroquine (CQ) and sulfadoxine/pyrimethamine (SP). New and highly effective drugs have been introduced at both the public and private facilities. (Ministry of Health Uganda).

Matany hospital provides antenatal care services to pregnant women including malaria in pregnancy and carries out reaches to communities to carry out education about malaria in pregnancy.

1.2- STATEMENT OF THE RESEARCH PROBLEM

In Uganda malaria is endemic in most regions, accounting for one-third or more of outpatient morbidity in the population. In 2002 and 2008, there were 3.7 and 7.1 million cases of malaria in Uganda, resulting in 6,735 and 8,500 deaths respectively. Pregnant women are particularly vulnerable to malaria because pregnancy reduces the immunity to malaria, increases susceptibility to malaria infection, the risk of illness, severe anemia, acute pulmonary edema, renal failure, puerperal sepsis, postpartum hemorrhage and increase the risk of death; Malaria in pregnancy results in adverse pregnancy outcomes, such as spontaneous abortion, neonatal death and low birth weight, chronic anemia due to malaria may also affect a child's growth and intellectual development(Africa summit on roll back malaria, 2007). Despite the devastating effects of malaria, there are no records of prevalence of malaria in pregnancy and associated factors in the population of study (Africa Summit on Roll Back Malaria, 2007).

Despite the abundant knowledge of people about malaria and the countless programmes, education, and funds and other resources available to combat malaria, malaria still remains a Aproblem and a challenge among the communities served by Matany Hospital. It is also true that many of absenteeism in school and work place most of the time is due to malaria. Therefore, there was need and reason to assess the prevalence of and risk factors associated with malaria in the community and also to understand why malaria still remains a problem among diseases with high mortality in pregnant women and children below 5 years, though people have enough knowledge about malaria and countless programmes put in place to fight it.

1.3-RESEARCH QUESTIONS

- What is the prevalence rate of malaria among pregnant mothers presenting to St. Kizito Hospital Matany?
- What are the factors associated with malaria among pregnant women presenting to St. Kizito Hospital Matany?

1.4-STUDY OBJECTIVES

GENERAL OBJECTIVE

To determine the prevalence and risk factors associated with malaria among pregnant women attending maternity ward and antenatal care at St. Kizito Hospital Matany.

SPECIFIC OBBJECIVES

- To determine the number of cases of malaria in pregnancy from July 2013 to July 2014 at St. Kizito Hospital Matany.
- To determine the demographic and non demographic factors associated with malaria among pregnant women who attended St.Kizito Hospital Matany over the study period.

1.5-SIGNIFICANCE OF THE STUDY

The study came up with the prevalence rate and factors associated with malaria in pregnancy at St. Kizito Hospital Matany, which will be of importance in future proper planning for drugs and education of the community/masses and patients on ways of avoiding the risk factors.

The results already got from the study will be used to create public awareness on the current state of malaria in pregnancy as well as exposing the risk factors and measures to prevent and control malaria.

The study also looked in to how to prevent malaria among pregnant women hence consequently will lead to reducing the incidence and prevalence of malaria in pregnancy and eventually reducing the socio-economic burden of malaria.

The study was undertaken in partial fulfillment of the requirements for the award of bachelor's degree in medicine and surgery of Kampala International University.

The study assessed the prevalence of malaria in pregnancy at St. Kizito Hospital Matay and came up with recommendations on how to reduce the incidence of malaria as it has a lot of complications to the mother and the child and social and economical implications to the community and the Government.

CHAPTER TW0

LITERATURE REVIEW

2.1- INTRODUCTION

Malaria is an infectious disease caused by a parasite (plasmodium) which is transmitted from human to human by the bite of infected female anopheles mosquitoes. The disease is caused by the protozoan parasite plasmodium, which lives in the red blood cells with the serious infections being caused by plasmodium falciparum and plasmodium vivax (WHO, 2011).

Malaria is an Italian word that means “bad air”, Malaria parasites have been around for some time. Fossils of mosquitoes up to 30 million years have been found. So malaria could have been around for more than 30 million years, but humans only known of it for the past 4,000 years. There is no origin place for malaria, but some believe it originated in Africa. The first recorded treatment of malaria was in 1600, Native Peruvian Indians used bark from a cinchona tree to treat malaria (Gale, Mkenney, 2012).

According to the WHO 2003, Malaria remains one of the most important threats to the health of pregnant women and their new born. Since control is one of the most challenging in Africa were 45 countries including Uganda are endemic for malaria, and about 588 million people are at risk(WHO); The protection of pregnant women living in malaria endemic countries has been of peculiar interest to National malaria control programmes because of their reduced immunity. This is not unconnected to the fact that malaria pregnancy presents a unique problem. Pregnant women are at high risk of developing severe and fatal malaria because normal immune responses are reduced during pregnancy (WHO 2003)

2.2 -AETIOLOGY OF MALARIA

Malaria is caused by protozoa of the genus plasmodium and is spread by mosquitoes. There are several stages in the life cycle of plasmodium, including sporozoites, merozoites, and gametocytes. The bite of an infected mosquito transmits the sporozoite stage of the organism to humans. The parasite travels in to the blood stream and eventually makes its way to the liver,

where it begins to multiply, and producing merozoites. The merozoites leave the liver and enter red blood cells to reproduce. Soon, young parasites burst out in search of new red blood cells to infect. Sometimes, the reproducing plasmodium will create a form known as a gametocyte in the human bloodstream. If a mosquito takes a blood meal when gametocytes are present, the parasite begins to reproduce in the insect and create sporozoites that are infectious to people, completing the cycle (Mary Nettle man, MD, MS, MACP) (www.emedicinehealth.co > home>Infections center> Infections az list).

There are five species of mosquitoes that infect humans:

P. vivax: This species is most commonly found in Asia, Latin America, and parts of Africa. Infections can sometimes lead to life-threatening-rupture of the spleen. This type of malaria can hide in the liver and return later to cause relapse years after the first infection. Special medications are used to eradicate p. vivax from the liver.

P. ovale: This species is rarely found outside Africa or the western pacific islands. Symptoms are similar to those of p. vivax.Like p.vivax; p. ovale can hide in the liver for years before bursting out again and causing symptoms.

P. malariae: It is found worldwide but it is less common than the other forms. This form of malaria is hard to diagnose because there are usually very few parasites in the blood. If untreated, the infection can last many years.

P. falciparum: This is the most life- threatening species of malaria. Although present throughout much of the tropical and subtropical world, it is particularly common in sub-Saharan Africa. P. falciparum is resistant to many of the older drugs used to treat or prevent malaria.

P.knowlesi: Found predominantly in Malaysia, this species can cause high levels of parasitaemia in the blood, leading to organ failure or death.
(Mary,Nettleman,MD,MS,MACP),(www.emedicinehealth.co> home>
Infectionscenter>Infection az list).

2.3- RISK FACTORS ASSOCIATED WITH MALARIA IN PREGNANCY

Age and pregnancy states are among the highest risk factors for contracting malaria. Additional risk factors are proximity of households to rice-growing areas, extensive poverty in rural areas, lack of knowledge on how to prevent and treat malaria, little to no healthcare access, Transmission of malaria occurs year round in most parts of Uganda, and the climate and heavy rainfall greatly contribute to malaria transmission in 95% of the country. Rural inhabitants have a much higher risk of malaria transmission and in some districts receive more than 1,500 infectious bites per year. Malaria transmission is significantly reduced by use of Insecticide Treated Nets (ITN's); however, only 10% of children under five years and pregnant women sleep under ITN's. Further, only 12.8% of the country as a whole use ITN's and only 34% use basic mosquito nets; however the rate is greatly reduced in rural areas where prevalence is highest. The use of ITN's by children in urban areas outnumbers the rates in rural areas, despite the higher incidence of malaria. Ugandans are at risk for all four human plasmodium species, with p.falciparum being the most common and responsible for 90 to 98% of diagnosed cases and almost all cases of severe malaria. The most common malaria parasites in Uganda are the Anopheles gambiaes. And the A. Funestus and without the use of ITN's and indoor residual spraying (IRS), the population remains at high risk. Additionally, due to the widespread use of sub-standard or counterfeit drugs, resistance to anti-malarial drugs is an increasing problem, and those without proper care risk resistance (Ministry of Health Uganda).

Pregnant women are more likely than non pregnant women to get malaria, because the immune system is suppressed during pregnancy. In addition pregnant women are more likely to have serious complications if they get malaria. HIV magnifies the effect of malaria among pregnant women and their infants. HIV-infected pregnant women have significant alterations in both cellular and humoral immunity to malaria (Ned R.M; et al., 2005). As a result, HIV-infected women, regardless of parity, are at greater risk of clinical and placental malaria and experience greater rates of anemia and adverse birth outcomes than HIV-uninfected women. They are also at greater risk of increased malaria parasite density as compared to HIV-negative women and this, in turn, is associated with worse anemia. HIV increases susceptibility to malarial infection and the presence of malaria causes an increase in HIV viral load (Antelman G. et al.,2010). Primigravidae are at highest risk of malarial infection and serious complications. Pregnant

women with one previous birth are also at higher risk. Younger maternal age (particularly adolescence) carries a higher risk of infection and adverse effects; second trimester carries the highest risk of infection. Some studies suggest the increased risk disperses quickly after delivery, others that the first two months postpartum continue to carry an increased risk of infection (Antelman G. et al., 2010).

2.4- EPIDEMIOLOGY

Malaria is endemic throughout most of the tropics. Of the approximately 3.4 billion people worldwide who are exposed annually, 1.2 billion are at high risk; the world Health Organization (WHO) states that more than 207 million developed symptomatic malaria in 2012(WHO. World Malaria Report 2013). Between 2000 and 2010, the number of reported annual malaria cases in 34 malaria eliminating countries decreased by 85% from 1.5 million to 232,000 cases (WHO, World Malaria report 2011). Most of these are attributed to p.falciparum, but p.vivax and p. knowlesi can also cause severe disease. Malaria death peaked at 1.82 million in 2004 and fell to 1.24 million in 2010. Over 80% of the death occurs in sub-Saharan Africa (Murray CJ et al 2012). The WHO's estimate of the death from malaria (627,000 in 2012; uncertainty range 473,000 to 789,000) are approximately half the more reliable estimates above (WHO, 2012).

Important components for reducing the burden of malaria morbidity and mortality include more sensitive diagnostic tools, effective use of antimalarial drugs, and improved personal and community protection and mosquito control. The approach to elimination or control of malaria includes these basics, along with improvement in tracking of human illness and parasite surveillance, and effective resource delivery. Malaria is transmitted via the bite of a female Anopheles spp mosquito, which occurs mainly between dusk and dawn. Other comparatively rare mechanisms for transmission include congenitally acquired disease, blood transfusion, sharing of contaminated needles, and organ transplantation. Malaria occurs throughout most of the tropical regions of the world, with p. falciparum causing the largest burden of disease, followed by p. vivax. P. falciparum predominates in Africa New Guinea, and Hispaniola (Haiti and the Dominican Republic); p. vivax is more common in the Americas and the western pacific. The prevalence of the two species is approximately equal in the Indian subcontinent, eastern Asia, and Oceania. P. malariae is uncommon and is found in most endemic areas, especially sub-Saharan Africa. P. ovale even less common, is relatively unusual outside Africa and, where it is

found, comprises <1 percent of isolates. P. knowlesi, similar morphologically to p. malariae, has been identified by molecular methods in patients in Malaysia, Philippines, Thailand, and Myanmar; this species has not yet been proven to be transmitted from human to mosquitoes (i.e., a monkey reservoir may be required to infect the mosquitoes)(WHO 2012).

Uganda's high rates of malaria disproportionately affect pregnant women in rural areas who experience extreme poverty, limited access to health services, and lack of education. Malaria has negative health and economic effects, and restricts the productivity of the population. Increased Insecticide Bed Treated Nets (ITN) coverage and education, and improved access to and delivery of treatment and emergency control of malaria are essential to control malaria in Uganda. Malaria is the leading cause of morbidity and mortality in Uganda. The country has the world's highest malaria incidence, with a rate of 478 cases per 1000 population per year. Uganda has the third largest malaria burden in Africa and the sixth largest in the world. Currently, 95% of the population is at highly endemic risk and the remaining 5% of the country is prone to malaria epidemics. Malaria is responsible for up to 40% of all hospital admissions, and 14% of all hospital death. An estimated 12 million clinical cases are treated annually in the public health system alone. Additionally, malaria affects maternal morbidity and mortality and is attributed as a cause of 65% of maternal mortality and 60% of spontaneous abortion. Additionally, 15% of life years lost to premature deaths are due to malaria and families spend 25% of their income on this disease (WHO 2012).

2.5- PREVALENCE OF MALARIA IN PREGNANCY

Each year, 50 million women living in malaria endemic areas become pregnant; one-half of these women live in Africa. It is estimated that 10,000 women and 200,000 infants die as a result of malaria infection during pregnancy; Severe maternal anemia, prematurity, and low birth weight contribute to more than half of these deaths (Peter A chedraui, 2014). Malaria in pregnancy continues to be a serious health risk for pregnant women in Uganda and is associated with increased risk of maternal anemia and perinatal mortality. Isolated studies show that prevalence of placental infection with plasmodium falciparum malaria in pregnant women can be as high as 62.1% in some areas. Although all pregnant women may be at risk of malaria, its complications are greatest in those with modified immunity such as primigravidae, secundigravidae,

adolescents, immigrants/visitors from non endemic areas and those infected with HIV (Peter A chedraui, 2014).

2.6 -PRESENTATION OF MALARIA

Patients with malaria typically become symptomatic few weeks after infection, although the host's previous exposure or immunity to malaria affects the symptomatology and incubation period. In addition, each plasmodium species as a typical incubation period. Importantly virtually, all patients with malaria present with headache. Clinical symptoms also include the following: Cough, fatigue, malaise, shaking chills, Arthralgia, myalgia. Paroxysm of fever, shaking chills, and sweats (every 48 or 72 hours, depending on the species). The classic paroxysm begins with a period of shivering and chills, which lasts for approximately 1-2 hours and is followed by a high fever. Finally, the patient experiences excess diaphoresis and the body temperature of the patient drops to normal or below normal (emedicine.medscape.com / article /2211…)

Many patients particularly early in infection do not present the classic paroxysm but may have several small fever spikes a day. Indeed the periodicity of fever associated with each species (i.e., 48 hours for p. falciparum, p. vivax, and p. ovale [or tertian fever]; 72 hours for p. malariae [or quartan fever]) is not apparent during initial infection because of multiple broods emerging in the bloodstream. In addition, the periodicity is often not observed in p. falciparum infections. Patients with long standing, synchronous infections are more likely to present with classic fever patterns. In general, however, the occurrence of periodicity of fever is not a reliable clue to the diagnosis of malaria. Less common malarial symptoms include the following: Anorexia and lethargy, Nausea and vomiting, Diarrhoea, Jaundice. Notably, infection with p. vivax, particularly in the temperate areas of India, may cause symptoms up to 6-12 months after the host leaves the endemic area. In addition, patients infected with p. vivax or p. ovale may relapse after longer periods, because of the hypnozoite stage in the liver (emedicine. Medscape. Com / article /2211…)

P. malariae does not have a hypnozoite stage, but patients infected with p. malariae may have a prolonged, asymptomatic erythrocytic infection that becomes symptomatic years after leaving the endemic area. Tertian and quartan fevers are due to the cyclic lysis of the red blood cells that

occurs as trophozoite completes their cycle in the erythrocytes every 2 or 3 days, respectively. P. malariae causes quartan fever; p. vivax and p. ovale cause the benign form of tertian fever, and p. falciparum causes the malignant form. The cyclic pattern of fever is very rare.

Physical examination

Most patients with malaria have no specific physical findings, but splenomegaly may be present. Symptoms of malaria infection are non specific and may manifest as flulike illness with fever, headache, malaise, fatigue, and muscle aches. Some patients with malaria present with diarrhoea and other gastrointestinal (GI) symptoms. Immune individuals may be completely asymptomatic or may present with mild anemia. Non immune patients may quickly become ill. Severe malaria primarily involves p. falciparum infection, although death due to splenic rupture has been reported in patients with non p. falciparum malaria. Severe malaria manifests as cerebral malaria, severe anemia, repertory symptoms and renal failure (emedicine. Medsape. Com / article /2211…)

Cerebral malaria

This feature is almost always caused by p.falciparum infection. Coma may occur; coma can usually be distinguished from a postictal state secondary to generalized seizure if the patient does not regain consciousness after 30 minutes. When evaluating comatose patients with malaria, hypoglycemia and CNS infections should be excluded (emedicine. Medscape. Com / article / 2211…)

Severe anemia

The anemia associated with malaria is multifactorial and is usually associated with p. falciparum infection. In non immune patients, anemia may be secondary to erythrocytic infection and a loss of infected RBC's, In addition, Uninfected RBC's are inappropriately cleared, and bone marrow suppression may be involved.(emedicine. Medscape.com / article /2211…)

Renal failure

This is a rare complication of malarial infection. Infected erythrocytes adhere to the microvasculature in the renal cortex, often resulting in oliguric renal failure. Renal failure is

typically reversible, although supportive dialysis is often needed until kidney function recovers. In rare cases, chronic p. falciparum malariae infection results in nephritic syndrome (emedicine. Medscape. Com / article / 2211…)

Respiratory symptoms

Patients with malaria may develop metabolic acidosis and associated respiratory distress. In addition, pulmonary edema can occur. Signs of malarial hyperpneic syndrome include alar flaring, chest retraction (intercostal or sub costal), use of accessory muscles for respiration, or abnormally deep breathing (emedicine. Medscape.com / article /2211…)

2.7- EFFECTS OF MALARIA DURING PREGNANCY

There are many adverse effects of malaria during pregnancy and pregnant women are known to be more prone to contracting malaria than those not pregnant. The condition of malaria in pregnant woman also tends to be much more serious than that developed by a woman who is not pregnant. The problem with a pregnant woman is that the drugs that can be normally used to treat this condition cannot be used on her. This is because some of the common drugs of malaria treatment are harmful for the woman in her vulnerable condition and also for the developing baby (Vatsal Anand, 2013).

A woman's immune system is affected during pregnancy. She becomes much more susceptible to developing malaria which at times even leads to death of the child before birth or right after delivery. More than three million pregnant women are affected with malaria in developing countries. It causes serious complications to the affected woman like maternal anemia, fetal anemia and even death. Some adverse effects of malaria during pregnancy are: Anemia, Fever, Altered blood sugar levels, Infection that harms the genitals, Build up of fluids in the lungs, Chances of cerebral malaria and other neurological problems. As already mentioned, treatment for malaria in a pregnant woman becomes tough because of her suppressed immune system. The natural changes in a woman's immune body during pregnancy make control of temperature and essential fluids very difficult. Care should be taken to protect a woman from having to suffer these harmful effects of malaria during pregnancy (Vatsal Anand, 2013).

Pregnant women in malarious areas may experience a variety of adverse consequences from malaria infection including maternal anemia, placental accumulation of parasites, low birth weight(LBW) from prematurity and intrauterine growth retardation(IUGR), fetal parasite exposure and congenital infections, and infants mortality(IM) linked to preterm LBW and IUGR-LBW (R W Steketee, 2014).

Over 125 million pregnancies are at risk of malaria infection each year. During pregnancy malaria parasites sequester in the placenta and create an inflammatory environment at the maternal-fetal interface. Malaria infection during pregnancy has profound maternal and fetal health consequences including anemia, preterm delivery, and small for gestational age and low birth weight infants (Peter A. Silverman, 2013).

The health of the mother impacts the family and even the community. Her ability and access to receive necessary healthcare largely determines health outcomes for herself and her baby. Like many developing countries Uganda has high maternal mortality rates, which is often reflective of access to healthcare services. Even when healthcare services are available, they are often understaffed and low on supplies which can also have an effect. Traditionally, Ugandan women seek to handle birth on their own as it is a time when they can use their own power and make their own decisions which can also be a factor in such a high maternal mortality rate. Many women report mistreatment from healthcare personnel as an additional reason to avoiding professional care during pregnancy and labour. A study also found that a majority of Ugandan women lack literacy and in turn seek care in more traditional or homeopathic ways. Malaria is also substantial issue. Pregnant women and their new born babies are particularly susceptible to complications related to malaria, which is endemic in Uganda (WHO, Maternal Health, 2012).

2.8 -DIAGNOSIS OF MALARIA

Prompt and accurate diagnosis is critical to the effective management of malaria. Malaria diagnosis involves identifying parasites or antigens/ products in the patient blood. Although this may seem simple, the diagnostic efficacy is subject to many factors. The different forms of the 5 malaria species, the different stages of erythrocytic schizogony, the endemicity of different species, the interrelation between levels of transmission, population movement, parasitaemia, immunity, and signs and symptoms, drug resistance, the problems of recurrent malaria, persisting

viable or non viable parasitaemia, and sequestration of the parasites in the deeper tissues, and the use of chemoprophylaxis or even presumptive treatment on the basis of clinical diagnosis, can all influence the identification and interpretation of malaria parasitaemia in a diagnostic test. Malaria is a potential medical emergency and should be treated accordingly. Delay in diagnosis and treatment are leading causes of death in many countries (Malaria Diagnosis: A Brief Review, June 2009).

Clinical diagnosis of malaria

A clinical diagnosis of malaria is traditionally among medical doctors. This method is least expensive and most widely practiced. Clinical diagnosis is based on the patient's signs and symptoms, and on physical findings at examination. A clinical diagnosis of malaria is still challenging because of the non-specific nature of the signs and symptoms, which overlap considerably with other common, as well as potentially life-threatening symptoms with other tropical diseases impair diagnostic specificity, which can promote the indiscriminate use of antimalarials and compromise the quality of the care for patients with non-malarial fevers in areas (Mwangi TW et al .Trop Med Int Health.2005),(Reyburn H, et al, BMJ.2004)(McMorrow ML, et al. AM J Trop Med Hyg. 2008). Therefore the accuracy of malaria diagnosis can be greatly enhanced by combining clinical and parasite-based finding (Kyabayinze DJ et al. Malar J. 2008).

Laboratory diagnosis of malaria

Rapid and effective malaria diagnosis not only alleviates suffering, but also decreases community transmission. The nonspecific nature of the clinical signs and symptoms of malaria may result in over treatment of malaria or non-treatment of other diseases in malaria endemic-areas, and misdiagnosis in non-endemic areas (Bhandari PL, et al. Indian J Pathol Microbiol.2008). In the laboratory, malaria is diagnosed using different techniques, e.g. Conventional microscopic diagnosis by staining thin and thick peripheral blood smears (Ngasala B, et al. Malar J. 2008), other concentration techniques e.g. quantitative Buffy coat (QBC) method, rapid diagnostic tests e.g., optimaL, Para screen, Para check, and molecular diagnostic methods, such as polymerase chain reaction (Harvery SA, et al. Malar J. 2008).

Microscopic diagnosis using stained thin and thick peripheral blood smears (PBS)

Malaria is conventionally diagnosed by microscopic examination of stained films using, Giemsa, Wright, or Field's stains. Microscopic detection and identification of plasmodium species in Giemsa-stained thick blood film (for screening the presenting malaria parasite), and thin blood films (for species confirmation) remains the gold standard for laboratory diagnosis.

Rapid diagnostic tests (RDT's)

Since the World Health Organization (WHO) recognized the urgent need for new, simple, quick, accurate, and cost-effective diagnostic tests for determining the presence of malaria parasites, to overcome the deficiencies of light microscopy, numerous techniques have been developed. This, in turn, has led to an increase in the use of RDT's for malaria, which are fast and easy to perform, and do not require electricity or specific equipment. RDT's are all based on the same principle and detect malaria antigen in blood flowing along a membrane containing specific anti-malarial antibodies; they do not require laboratory equipment (WHO. Bull World Health Organ. 2013).

Molecular diagnostic methods

Are highly sensitive, highly specific, without subjective variation, are urgently needed in various laboratories e.g. PCR, Loop-mediated Isothermal amplication (LAMP), microarray, mass spectrometry (MS), and flow cytometric (FCM) assay techniques.

PCR

It is one of the most specific and sensitive diagnostic methods, particularly for malaria cases with low parasitaemia or mixed infections. It is used extensively to confirm malaria infection, follow up therapeutic response, and identify drug resistance. Now seems the best method for malaria diagnosis because of higher sensitivity and specificity than microscopic examination of thin and thick films. PCR can detect as few as 1-5 parasites/micro liter of blood compared with around 50-100 parasites/micro liter of blood by microscopy or RDT. May be automated to process large numbers of samples (Hawkes M, et al. 2007)

Serological tests

Diagnosis of malaria using serological methods is based on the detection of antibodies against asexual blood stage malaria parasites. Immunofluorescence antibody testing (IFA) has been a reliable serologic test for malaria in recent decades. Although IFA is time-consuming and subjective, it is highly sensitive and specific. IFA is useful in epidemiological surveys, for screening potent blood occasionally for providing evidence of recent infection in non-immunes. Finally, the level of malaria endemicity, the urgency of diagnosis, the experience of the physician, the effectiveness of the healthcare workers, and budget resources, are all factors influencing the choice of malaria-diagnostic method (She HC, et al. J Travel Med. 2007).

2.9 -SOCIO-ECONOMIC IMPACT OF MALARIA

In many developing countries malaria appears to be the enemy number one in public health. Numerous African countries do not have at their disposal the infrastructures and resources necessary to organize sustainable antimalarial campaigns. In Africa today, malaria is understood to be both a disease of poverty and a cause of poverty. Economic growth in countries with high malaria transmission has historically been lower than in countries without malaria. Thus, malaria represents a serious burden on economic development. Economists believe that malaria is responsible for a growth penalty of up to 1.3% per year in some African countries. Malaria may account for as much as 40% of public health expenditure, 30-50% of in-patient admissions, and up to 50% of out-patients visits. Malaria has been estimated to cost Africa more than $US 12 billion every year in cost GDP. Malaria has a great impact on Africa's human resources. Not only does malaria result in lost life and lost productivity due to illness and premature death, malaria also hampers children's schooling and social development through both absenteeism and permanent neurological damage. African countries, aware of the economic consequences due to malaria, now devote more resources to antimalarial struggle, as a major element of poverty-reducing strategies (WHO, Roll Back Malaria).

Malaria costs the Ugandan economy over 60 million working person-hours a year and negatively affects every sector of the economy. At a household level the effects of malaria can be devastating due to treatment cost and missed work. Socio economic status in households with malaria infection is up to 20% lower than in those without. Further, it is estimated that average Ugandan spends approximately 25% of household income treating malaria. For the rural poor, this represents life and death decisions about how to stretch meager resources to treat such a

virulent disease. And while the rural economy is devastated by malaria, the truth remains that effective national malaria control costs less than the cumulative costs associated with the disease. A national investment in malaria eradication is an investment not only in the economic wellbeing of the country, but it is an investment in the mothers and children of the nation. Uganda's future hangs in balance. We believe these lives can be saved (Pilgrim Africa, 2013).

Malaria poses a significant risk to our countries overall health and economy. Malaria has negative economic effects for the national economy due to lack of production and at the household level causes an immense burden, particularly for the poorest households, by reducing the number of days a patient can work by seven per episode and additional costs relating to care. This also creates a heavy burden upon the health system, with malaria accounting for up to 40% of all outpatient visits, 25% of all hospital admissions, and 14% of all hospital deaths. Malaria infections received by pregnant women results in adverse pregnancy outcomes, including spontaneous abortions, neonatal deaths, and low birth weight, and is estimated to cause as many as 10,000 maternal deaths each year, 8% to 14% of all low birth weight babies, 3% to 8% of all infant deaths. Other malaria related complications during pregnancy lead to reduced neurocognitive function in the child, which can lower educational attainment, depress literacy rates, and damage long-term health and labour productivity, which further affect the economic growth (WHO Roll Back malaria).

2.10- TREATMENT OF MALARIA IN PREGNANCY.

In Uganda:

-Treatment for uncomplicated malaria in pregnant women.

Quinine is used, instead of Artemisinin Combined Treatment (ACTs) which are contraindicated in pregnancy.

Artemether/Lumefantrine or Artemisinin Combined Treatment (ACTs) can be used after the first trimester.

-Treatment of severe and complicated malaria.

Parenteral quinine is the recommended treatment for the management of severe malaria for all patients.
Parenteral Artesunate or Artemeter are the alternatives.

(UCG.2012, Ministry of Health Uganda).

2.11 -PROGNOSIS OF MALARIA

Most patients with uncomplicated malaria exhibit marked improvement within 48 hours after the initiation of treatment and are fever free after 96 hours. P.falciparum infection carries a poor prognosis with a high mortality rate if untreated. However, if the infection is diagnosed early and treated appropriately, the prognosis is excellent (Emilo V Perez-Joge,MD,FACP; 2014)

Complications

Most complications are caused by p. falciparum. One of them is cerebral malaria, defined as coma, altered mental status, or multiple seizures with p falciparum in the blood. Cerebral malaria is the most common cause of death in patients with malaria. If untreated this complication is lethal. Even with treatment, 15% of children and 20% of adults who develop cerebral malaria die. The symptoms of cerebral malaria are similar to those of toxic encephalopathy. Other complications of p. falciparum infection include the following:

-Seizures-secondary to either hypoglycemia cerebral malaria.

-Renal failure-As many as 30% of non immune adults infected with p. falciparum suffer acute renal failure.

-Hypoglycemia.

-Hemoglobinuria (black water fever)-Black water fever is the passage of dark urine, described as Madeira urine colored; hemolysis, hemoglobinemia, and hemzoinuria cause this condition.

-Non cardiogenic pulmonary edema-This affliction is most common in pregnant women and results in death in 80% of patients.

-Profound hypoglycemia-Hypoglycemia often occurs in pregnant women; it often is difficult to diagnose because adrenergic signs are not always present and because stupor already may have occurred in the patient.

-Lactic acidosis-This occurs when the microvasculature becomes clogged with p. falciparum; if the venous lactate level reaches 45mg/dl, a poor prognosis is very likely.

-Hemolysis resulting in severe anemia and jaundice.

-Bleeding(coagulopathy).
(Emilio V Perez-Jorge, 2014).

Internationally, malaria is responsible for approximately 1-3 million deaths per year. 80-90% of the deaths each year are in rural sub-Saharan Africa. Malaria is preventable and treatable. However, the lack of prevention and treatment due to poverty, war, and other economic and social instabilities in endemic areas results in millions of death each year (centers for Disease control and prevention. Malaria, 2011).

2.12 -PREVENTION AND CONTROL OF MALARIA IN PREGNANCY

Use of insecticide-treated mosquito nets (ITN) is the most cost-effective preventive measure currently known. It reduces mosquito-human contact by barricading, repelling, or killing mosquitoes. These nets should be used even before the woman conceives, throughout pregnancy, and thereafter with her newborn (Uganda Clinical Guideline (UCG), 2012. Ministry of Health).

The Uganda Ministry of Health Guidelines for malaria in pregnancy includes Intermittent Preventive Treatment (IPT) which, has been proven as a safe and effective method for reducing malaria among pregnant women. The current IPT policy states that all pregnant women even if they do not have fever or other signs and symptoms of malaria-should take 3 tablets of sulfadoxine pyramethamine(SP) between 4 and 6 months of pregnancy and 3 tablets between 7 and 9 months. Pregnant women infected with HIV should take 3 doses of SP and 1 month apart or stay on cotrimoxazole (e.g. septrin) (Uganda Ministry of Health).

If there is a history of allergic reaction to sulphonamide, SP is not given but emphasize use of the other available infection control options, especially the ITNs (UCG 2012, Ministry of Health).

Expectant mothers are given ferrous salt (sulphate) plus folic acid and Mebendazole(or albendazole) for deworming to complement SP in preventing maternal anemia found in >60% of all those attending antenatal care(ANC). Folic acid is given 1 week after administration of SP to avoid antagonism between the two drugs (UCG 2012, Ministry of Health).

Education messages to the mothers and the community on the following:

-Transmission of malaria, by anopheles mosquitoes.

-Those at risk, women and children.

-If untreated, malaria can cause severe anemia and death in pregnant women.

-Malaria can lead to anemia, miscarriage, still birth, mentally-retarded children, or low birth weight children less able to survive compared to normal weight children.

-Better and cheaper to prevent than to treat malaria.

-The individual, family, and the community can control malaria by taking appropriate actions.

-Simple, uncomplicated malaria can be easily treated if recognized early, but it is very important to complete the course of the treatment in order to achieve a cure.

-Severe complicated malaria needs special management; therefore refer cases immediately to higher levels (UCG, 2012, Ministry of Health (MoH) Uganda).

Therefore malaria can be prevented by minimizing vector-human contact and to treat malaria disease promptly. Control by using mosquito net, clearing breeding places of mosquitoes, screening of doors and windows and insecticide spray (Ministry of Health Uganda).

CHAPTER THREE

METHODOLOGY

3.1-INTRODUCTION

The methodology included the study design, the study area, the study population, sample size determination, data collection tools, data analysis, inclusion and exclusion criteria and ethical considerations.

3.2-STUDY AREA

Saint KizIto Hospital Matany was the area of study. It is almost a referral hospital in Karamoja region and is situated in a large catchment area and has better obstetric care and facilities than the neighboring regional referral hospital, Moroto Hospital.

Saint Kizito Hospital Matany, commonly known as Matany Hospital is a private hospital located in Matany trading center, Matany sub county, Napak District, Karamoja sub-region, North eastern Uganda. The hospital is located approximately 40 kilometers (25) miles, by road, southeast of Moroto, the nearest large town. Matany lies approximately 385 kilometers (239 miles), by road, northeast of Kampala, the capital of Uganda and the largest city. Matany hospital is a private, non-profit, community hospital owned by the Roman Catholic Diocese of Moroto and is accredited by the Uganda Catholic Medical Bureau. The hospital is administered by comboni sisters, a religious congregation. The hospital has a capacity of 226 beds.

Matany hospital maintains an attached Nursing and Midwifery Training school, an airstrip (Matany Airstrip). Due to the relatively well maintained infrastructure, compared to nearby Moroto Regional Referral hospital, Matany hospital functions as a referral hospital for the Karamoja sub-region and for the nearby districts of Amuria, Katakwi and Soroti.

3.3-STUDY DESIGN

The study was a retrospective and descriptive study, reviewing records from the records department of Matany hospital from July 2013 to July 2014.

3.4-STUDY POPULATION

The study population consisted of all pregnant women within the fertility age, who presented to Matany hospital, from July 2013 to July July 2014.

3.5-SAMPLING TECHNIQUE AND SAMPLE SIZE

All patients who were diagnosed with malaria in pregnancy at Matany hospital from July 2013 to July 2014. Sample was collected from the department of obstetrics and Gynecology of patients at Matany hospital.

3.6-DATA COLLECTION PROCEDURE

Data was collected using data collection sheets. Records of patients who were diagnosed with malaria in pregnancy from July 2013 to July 2014 were obtained.

3.7-STUDY INSTRUMENTS

Data collection sheet was employed, pens, exercise books, rulers, calculator, computer.

3.8-DATA MANAGEMENT AND ANALYSIS

Data was analyzed using Microsoft excel, calculator and presented in form of pie charts, tables, percentages, and bar graphs.

3.9-SELECTION CRITERIA

INCLUSION CRITERIA

- Pregnant women who attended Matany hospital from July 2013 to July 2014.
- Pregnant women who attended Matany hospital in antenatal clinic, maternity and obstetric wards.
- Pregnant women with malaria as proven by a positive blood slide.

EXCLUSION CRITERIA

- Pregnant women who did not present to matany hospital July 2013 and after July 2014.
- Pegnant women who presented to hospital but with incomplete records.

3.10-STUDY LIMITATIONS

- Incomplete data from the records.
- Insufficient funds to carry out the research
- Time limitation
- Inaccessibility to all of the required patient's information,

3.11-TIME FRAME

The activities were concluded within the duration specified in the work plan, as follows:

Proposal writing and approval……July 2014

Data collection:…….....August 2014

Data compilation, analysis and presentation:……September 2014 to December 2014

3.11-ETHICAL CONSIDERATIONS

- A letter for introduction was obtained from faculty of clinical medicine and dentistry Kampala International University Western Campus.
- The study was carried out after consent from Matany hospital to access records.

3.12-DISSEMINATION OF RESULTS.

Results derived from this study to be presented to the faculty of clinical Medicine and Dentistry Kampala International University Western Campus, research supervisor, Saint Kizito Hospital Matany, personal copy and the local government offices for possible policy implications and to be published in journals as Scholarly contribution to the international community.

CHAPTER FOUR

RESULTS

4.1 OVERVIEW

This chapter presents results of qualitative and quantitative findings. The section covers the findings on prevalence of malaria in pregnancy to total number of patients who visited antenatal clinic at Matany hospital and were admitted at obstetric and genecology wards from July 2013 to July 2014. The total number of patients who visited antenatal clinic and were admitted in obstetric ward were 1861 patients. Out of this number, 213 patients had a working diagnosis of malaria in pregnancy. 26 of the patients had malaria in pregnancy with HIV. 19 had malaria in pregnancy with urinary tract infection (UTI).

Therefore prevalence of malaria during this time was 11.40%, giving the ratio of 11 patients diagnosed with malaria in 100 pregnant women (11:100).

Majority of the patients were primigravidae, 68 out of 213 patients indicating a percentage of approximately 32%.

TABLE 1: SHOWS TOTAL NUMBER OF PATIENTS COMPARED TO MALARIA CASES, MALARIA ASSOCIATED WITH HIV, UTI, AND ANAEMIA PER MONTH.

Month	**Total No.**	**Malaria**	**HIV**	**UTI**	**Anemia**
July 2013	158	13	03	01	01
August 2013	87	12	03	01	-
September 2013	125	11	06	01	-
October 2013	131	23	06	04	02
November 2013	140	15	01	02	-
December 2013	145	23	02	02	-
January 2014	212	25	05	01	-
February 2014	115	08	02	02	01
March 2014	157	06	04	02	-
April 2014	129	10	06	01	-
May 2014	123	13	07	-	-
June 2014	191	29	04	01	-
July 2014	148	25	02	01	-
TOTAL	**1861**	**213**	**26**	**09**	**04**

The table above is a summary of all patients and number of malaria in pregnancy cases and malaria cases associated with HIV, UTI and anemia from July 2013 to July 2014 as per ANC and obstetric records.

TABLE 2: INDICATES OVERALL PERCENTAGE AND PERCENTAGE OF MALARIA CASES PER MONTH.

MONTH	TOTAL NUMBER	MALARIA IN PREGNANCY CASES	PERCENTAGE
July 2013	158	13	8.2
August 2013	87	12	13.78
September 2013	125	11	8.8
October 2013	131	23	17.5
November 2013	140	15	10.7
December 2013	145	23	15.86
January 2014	212	25	11.79
February 2014	115	08	6.95
March 2014	157	06	3.82
April 2014	129	10	7.75
May 2014	123	13	10.56
June 2014	191	29	15.18
July 2014	148	25	16.89
TOTAL	**1861**	**213**	**11.4**

The table above indicates the month of October had the highest percentage of malaria cases at 17.5% compared to the overall percentage of 11.4%.

TABLE 3: THE NUMBER AND PERCENTAGES OF CASES OF MALARIA IN PREGNANCY ASSOCIATED WITH HIV, UTI, AND ANEMIA.

MONTH	**MALARIA CASES**	**HIV**		**UTI**		**ANEMIA**	
		NO	**%**	**NO**	**%**	**NO**	**%**
July 2013	13	01	7.6	01	7.69	01	7.69
August 2013	12	01	8.3	01	8.3	_	_
September 2013	11	_	0.0	01	9.0	_	_
October 2013	23	03	13	04	17.9	02	8.69
November 2013	15	01	6.6	02	13.3	_	_
December 2013	23	02	8.6	02	8.6	_	_
January 2014	25	05	20	01	4.0	_	_
February 2014	08	01	12.5	02	25	01	12.5
March 2014	06	02	33.3	02	33.3	_	_
April 2014	10	02	20	01	10	_	_
May 2014	13	01	7.69	_	0.0	_	_
June 2014	29	04	13.79	01	3.4	_	_
July 2014	25	02	8.0	01	4.0	_	_
	213	**26**	**12.2**	**19**	**8.9**	**04**	**1.87**

Overall 12.2% of cases of malaria in pregnancy were with HIV infections, 8.9% were associated with UTI and 1.87% were associated with severe anemia.

TABLE 4: PERCENTAGE OF MALARIA IN PREGNANCY CASES ASSOCIATED WITH HIV COMPARED TO TOTAL NUMBER OF PATIENTS.

MONTH	TOTAL NUMBER OF PATIENTS	HIV	PERCENTAGE
July 2013	158	03	1.89
August 2013	87	03	3.4
September 2013	125	06	4.8
October 2013	131	06	4.58
November 2013	140	01	0.7
December 2013	145	02	1.37
January 2014	212	05	2.35
February 2014	115	02	1.73
March 2014	157	04	2.54
April 2014	129	06	4.65
May 2014	123	07	5.69
June 2014	191	04	2.09
July 2014	148	02	1.35
	1861	**51**	**2.74**

Out of the total number of patients (1861), 51 were HIV positive giving overall percentage of 2.74%.

TABLE 5: AGE DISTRIBUTION OF MALARIA IN PREGNANCY.

MONTH	**15-24**	**25-34**	**35 AND ABOVE**
July 2013	08	06	01
August 2013	06	07	02
September 2013	07	03	01
October 2013	17	06	03
November 2013	11	05	00
December 2013	12	06	01
January 2014	08	07	00
February 2014	02	02	00
March 2014	03	02	00
April 2014	05	01	02
May 2014	04	02	01
June 2014	15	10	01
July 2014	14	10	00
Total	**112**	**67**	**02**

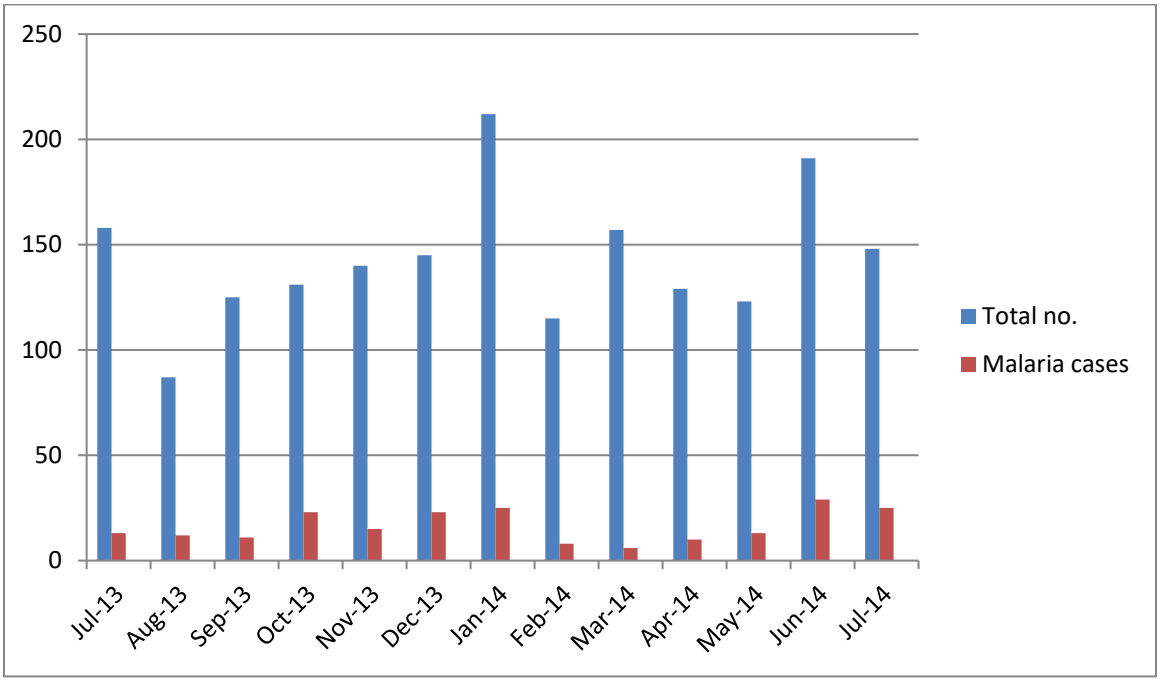
The table above indicates that the majority of cases of malaria in pregnancy were in the age bracket 15-24 years and that incidence of malaria decreased with age.

TABLE 6: CASES OF MALARIA IN PREGNANCY ACCORDING TO GRAVIDITY.

MONTH	**G1**	**G2**	**G3**	**G4**	**G5**	**G6**	**G7**	**G8**	**G9**	**G10**
July 2013	02	04	02	03	01	01	00	00	01	00
August 2013	03	04	01	03	01	01	00	01	00	00
September 2013	05	01	00	00	03	01	00	00	00	00
October 2013	09	09	01	00	02	01	01	01	00	00
November 2013	09	03	01	00	01	02	01	00	00	00
December 2013	08	03	05	01	02	00	00	00	00	00
January 2014	04	03	04	01	02	00	00	00	00	00
February 2014	02	00	01	00	00	00	00	00	00	00
March 2014	03	01	00	00	00	01	01	00	00	00
April 2014	01	00	01	00	01	00	00	00	02	00
May 2014	03	00	01	02	00	00	00	00	00	01
June 2014	07	07	08	03	01	00	00	00	00	00
July 2014	12	06	03	02	00	01	00	00	00	00
Total	**68**	**43**	**28**	**15**	**14**	**08**	**02**	**02**	**03**	**01**

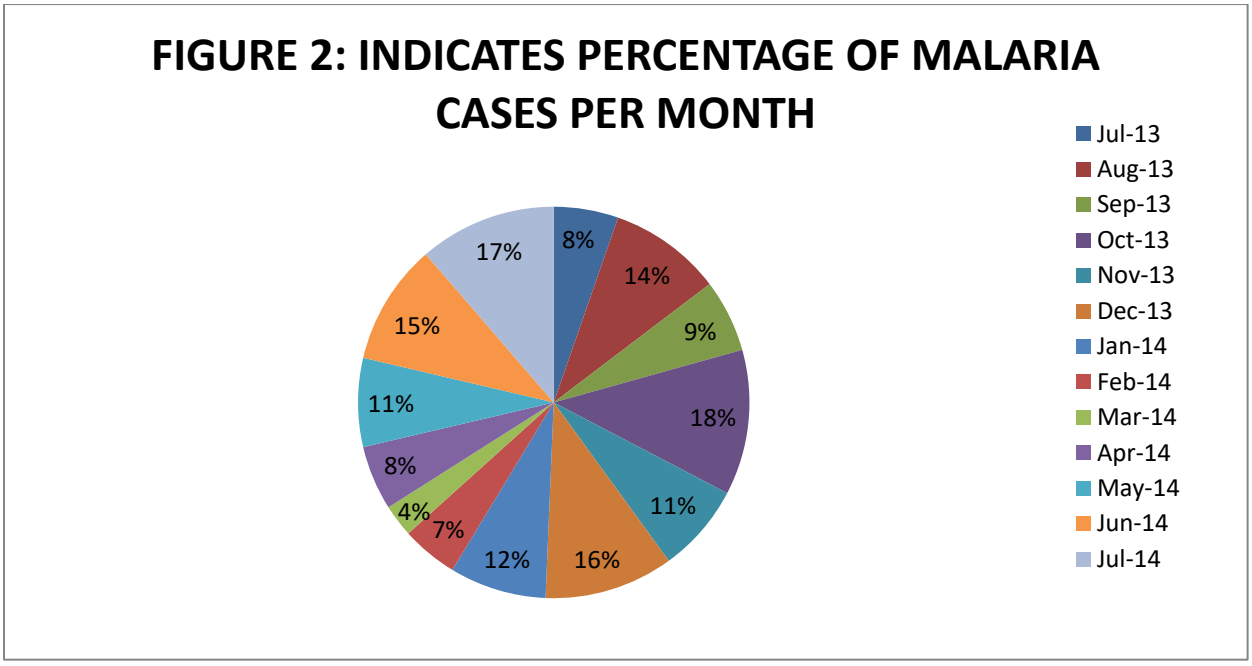
The table above shows that primigravividae had the majority of cases (68) of malaria in pregnancy and that susceptibility to malaria falls with increase in gravidity.

FIGURE 1: BAR GRAPH OF MALARIA CASES AND NUMBER OF PATIENTS PER MONTH (FROM JULY 2013 TO JULY 2014).



The above figure indicates that the number of case of malaria were few compared to the total number of cases per month with June having highest number (29) of malaria cases.

FIGURE 2: PIE CHART INDICATING PERCENTAGE OF MALARIA CASES PER MONTH



The Figure shows that October had the highest percentage of malaria cases followed by July and March had the lowest percentage.

COMPARISON BETWEEN UGANDA STATISTICS AND MATANY HOSPITAL STATISTICS OF PREVALENCE OF MALARIA IN PREGNANCY.

According to the results of the research, malaria in pregnancy accounts for 11.4% of all the pregnant mothers who presented at ANC clinic and were admitted in obstetric ward. In Uganda, malaria accounts for 25-40% of outpatient attendances, 20% of all admissions and 14% of all in-patient deaths (Ministry of health Uganda).

CHAPTER FIVE

DISCUSSION OF RESULTS

5.1 INTRODUCTION

The study was carried out to determine the prevalence and factors associated with malaria in pregnant women who presented to Matany Hospital from July 2013 to July 2014. It was a retrospective and descriptive study where data for the study was collected using data collection sheets.

5.2 PREVALENCE OF MALARIA IN PREGNANCY AT MATANY HOSPITAL

During July 2013 to July 2014, the total number of malaria cases was 213 out of 1861 patients who presented to ANC and were admitted in obstetric ward. This makes a prevalence of 11.4%. A ratio of 11 cases of malaria per 100 pregnant women.

According to gravidity the primigramidae had the majority of cases of malaria (68) with a percentage of 32%, which are 32 cases of malaria in every 100 pregnant mothers. This is in conformity with the various studies that primigravidae are more susceptible to malaria than the multigravidae.

Also the majority of cases of malaria in pregnancy were in the age bracket of 15-24 years and there was a decrease in incidence with age.

The results also showed that HIV increased the susceptibility of a pregnant mother to malaria. Supported by the fact that, out of the total number of mothers who had malaria, HIV prevalence was at 12.2%. In comparison to 2.74% prevalence of HIV in all the pregnant mothers (total number of patients). This therefore implies that HIV has an effect on increasing the susceptibility of the pregnant mother to malaria infection.

Also urinary tract infection was associated with malaria in pregnancy at 8.9% (in every 100 pregnant women with malaria, approximately 9 had urinary tract infection).

Anemia was also associated with malaria in pregnant women (1.87%), (that is in every 100 pregnant women with malaria, approximately 2 had severe anemia).

In comparison a cross sectional study conducted at Mulago Hospital in Kampala, Uganda, to assess the plasmodium falciparum burden came up with; malaria prevalence by each of three measures, peripheral smear, placental smear and placental histology of 9%(35/391), 11.3% (44/389), and 13.9% (53/389) respectively. Together, smear and histology data yielded an infection rate of 15.5% (59/380) of active infections and 4.5% (17/380) of past infections; hence 20% had been or were infected when giving birth. A crude parity dependence was observed with main burden being concentrated in gravidae 1 through gravudae 3, which agees with the result of this research also. Twenty two percent were afflicted by anaemia (Fatuma et al, 26 Aug 2010)

Therefore, though these numbers of cases of malaria in pregnancy in this research result may be relatively high (percentage of 11.4% is high) compared to the result of peripheral smear (9%) comducted at Mulaga Hospital, the following could be some of the reasons; Some mothers do not utilize ANC services, they deliver at home and hence they are not captured hence the sample that was used may have not been the representative sample.

Because some mothers do not attend ANC services fully, they end up missing malaria prophylaxis hence increasing their chances of getting malaria (susceptibility).

Also may be a lot of campaigns have not been carried out towards educating the community about malaria, its causes, prevention and even its mortality level.

Also the climate may be another factor contributing to prevalence of malaria in area.

CHAPTER SIX

6.1-CONCLUSION

Based on the study results, the prevalence of malaria in pregnancy was somehow high, 11.4%. Most of the mothers diagnosed with malaria were between the ages of 15 to 24 years while those 35 years and above were list affected.

Demographic factors associated with malaria in pregnancy

According to age distribution

Pregnant mothers from 15 to 24 years had 112 cases of malaria.

Mothers 25 to 34 years had 68 cases of malaria.

Mothers 35 years and above had 02 cases of malaria.

Non demographic factors associated with malaria in pregnancy

Gravidity(G)

Primigravidae had the majority of cases(68), making a percentage of 32% and the number of cases decreased with increase in gravidity; G1=68; G2=43; G3=28; G4=15; G5=14; G6=08; G7=02; G8=02; G9=03; G10=01.

HIV

Mothers who had malaria in pregnancy with HIV were 26, a percentage of 12.2% compared to overall percentage of 2.74% for all pregnant women.

UTI

Mothers who had malaria in pregnancy with UTI were 19, a percentage of 8.9%.

Anaemia

Mothers who had malaria in pregnancy were 04, a percentage of 1.9%

CHAPTER SEVEN

7.1-RECOMMENDATIONS

From the study results, I would like to recommend the following;

The government should continue funding programmes and campaigns which educate people in the community about health matters, including malaria in pregnancy especially in rural areas where many people have no access to internet, news papers or available health services, so that the education about prevention of malaria and other diseases will be learnt and practiced.

- Aggressive health education on safe mother hood, effects of malaria in pregnancy and how to prevent it.
- Further studies should be carried out, so as to give better statistically accurate conclusion.
- Close health monitoring systems should be given to pregnant mothers especially during their second and third trimesters because these are the most vulnerable periods of malaria attack in pregnancy.
- Early diagnosis by blood slide for malaria parasites in pregnant women should be encouraged so as to prevent complications due to malaria.
- Since the health services costs are unaffordable to most members in the community considering Uganda is a developing country and many people live on far less than a dollar a day, where possible the government should provide health services for free or with little payment, as many people are dying because they can't afford the health services charges.
- Matany hospital should emphasize on the staff to participate effectively when they go in to the communities for outreaches, to benefit also the members of these communities by sharing the knowledge about malaria in pregnancy and other health problems.

7.2-RESEARCH CONSTRAINTS

- Data obtained from hospital records with information provided by patients, this could have resulted in inaccurate deductions.

- Some of data obtained from the files were incomplete and this could have resulted into inaccuracies in the research.
- Financial limitation.

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APPENDIX I

DATA COLLECTION SHEET

Name of hospital: Saint Kizito Hospital Matany.

Location: Matany, Matany sub county, Napak District.

Retrospective data from: July 2013 to July 2014.

No	Age	Address	Occupation	Parity	Gravidity	WOA	RCT		ANC		B/S	
							P	N	Y	N	P	N

APPENDIX II

RESEARCH WORK PLAN

OBJECTIVES	ACTIVITIES	TIME FRAME				
		July	**July**	**August**	**Sep-Dec**	**Personnel**
Administrative requirements	Choosing & Presentation of the research topic for approval					Supervisor Researcher
Proposal Writing	Writing a proposal and preparing research tools. Handing the proposal to the supervisor					Supervisor Researcher
Gathering data	Distribution of research tools and collection of data					Researcher
Data analysis	Compiling, Discussing, findings.					Data analyst and Researcher
Dissemination of information	Copies of the dissertation presented to the university, Supervisor, Sponsor, Institution where research was done and researcher					Researcher

APPENDIX III

RESEARCH BUDGET

SN	AIM	ACTIVITY	RESPONSIBLE PERSON	COST UGX
1	Proposal writing	a)Internet search b)Research proposal typing and printing c)Research proposal proofreading and approval	a)researcher b)Researcher and stationary workers c)Supervisor	a)30,000 b)30,000 c)free
2	Data collection Transport to collect data	a)Printing 150 research data collection sheets b)Facilitation of 2 assistant a)To and fro	a)Researcher b)Research assistants Researcher	a)50,000 b)40,000 c)230,000
3	Data analysis and research compilation	Computerized data analysis and result compilation	Statistician	100,000
4	Dissemination of research findings	Typing, Printing and binding of 5 copies of the final research report book (copies to the University, Supervisor, the institution where research is conducted and researcher)	Researcher, Stationary Artist	150,000
	GRAND TOTAL	**…….**	**…….**	**630,000**