PREVALENCE OF MALARIA IN PREGNANT WOMEN WHO ATTENDED KAMPALA INTERNATIONAL UNIVERSITY TEACHING HOSPITAL BETWEEN JANUARY 2015 AND DECEMBER 2015.

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A RESEARCH REPORT SUBMITED TO THE SCHOOL OF ALLIED HEALTH SCIENCES IN PARTIAL FULFILLMENT FOR THE AWARD OF A DIPLOMA IN CLINICAL MEDICINE AND COMMUNITY HEALTH OF KAMPALAINTERNATOINAL UNIVERSITY

JUNE 2017

DECLARATION

I **Nasasira Innocent** hereby declare that the work presented in this document is my own original work and has never in any way or form been presented or submitted to any other institution for publication or any award whatsoever.

SIGNATURE …….

DATE: …….

SUPERVISOR'S APPROVAL

This research report has been done under my supervision and is ready to be submitted for examination with my approval.

SUPERVISOR: MR. TASHOBYA DANIEL KAMUGISHA

Signature……

Date……

ACKNOWLEDGEMENT

First and foremost, I am thankful to the almighty God for the gift of life and good heath that has enabled me to reach this far in my studies and work as well.

Special appreciation to my research supervisor Mr. Tashobya Daniel Kamugisha for all the help and guidance he has accorded me throughout my research and without his efforts this work would be in vain.

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Last but not least, I extend my special thanks to all my classmates 143 series for the encouragement during the course of our study.

Thank you all so much.

DEDICATION

The research is dedicated to my family members, all my friends and more importantly to my supervisor Mr. Tashobya Daniel Kamugisha for his kindness, generosity and guidance. I appreciate every little contribution every one of you rendered towards this research report. Am humbled and God bless you all.

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ABBREVIATIONS

ANC – Antenatal care services

CSA – Chondroitin sulphate A

HA – Hyaluronic acid

HIV – Human immunodeficiency virus

Igs – Immunoglobulins

IPT/SP – Intermittent preventive treatment with sulfadoxine–pyrimethamine

ITN – Insecticide Treated Bed Net

IUGR – Intrauterine growth retardation

KIUTH – Kampala International University Teaching Hospital

LBW – Low birth weight

LLIN – Long lasting insecticidal nets

MIP –Malaria in pregnancy

PAM – Pregnancy associated malaria

PRBCs –*Plasmodium falciparum*-infected red blood cells

RDT – Rapid diagnostic tests

SES – Socio- economic status

WHO – World Health Organization

ABSTRACT

Introduction: Malaria is a life threatening parasitic disease transmitted by female anopheles' mosquitoes. It is the most highly prevalent tropical disease, with high morbidity and mortality and high economic and social impact. Malaria is a major public health problem affecting between 300–500 million people annually (Guyatt et al, 2004.)

Methodology: A cross-sectional retrospective study was carried out to assess the prevalence of malaria in pregnancy among pregnant women who attended Kampala International University Teaching Hospital with an objective of assessing the prevalence, preventive measures and outcomes of the condition.

Results: A total of 53 cased were found to have developed the condition in the year 2015. Thus the prevalence for that year was found to be 5.4% (54 cased per 1000 pregnant women).

The age group which was most affected was between 20 to 24 years. Women in their second trimester pregnancy had the highest rate of the condition (30.2%). Those in their third trimester were also the most affected (35.8%). Most women had taken the first dose of intermittent preventive therapy (52.8%) but only few had taken the second dose (26. 4%).The complications which were encountered were severe maternal anemia (9.4%), low birth weight (5%), preterm birth (4%), and fetal demise (2%)

Conclusion: The study will reveal whether the community is aware of the ways of the transmission of the disease i.e. bites from the infected mosquito, whether they have knowledge on how to prevent the disease and also its possible outcomes i.e. complications.

Recommendation People's attitudes should be geared towards knowing that it is their responsibility to reduce the prevalence of malaria in pregnancy in the community by making preventive measure such as vector control by draining stagnant water and clearing bushes around their homes.

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CHAPTER ONE:

1.1 INTRODUCTION

Malaria is a life threatening parasitic disease transmitted by female anopheles' mosquitoes .It is the most highly prevalent tropical disease, with high morbidity and mortality and high economic and social impact. Malaria is a major public health problem affecting between 300–500 million people annually (Guyatt et al, 2004.)

The plasmodium parasite that causes malaria is a single-celled parasite that multiplies in red blood cells of humans as well as in the mosquito intestine. There are five species of Plasmodium parasite that can cause malaria: falciparum, p. vivax, p. ovale, p. malarie and p. knowlesi. P. falciparum is responsible for the main disease burden afflicting primarily sub-Saharan Africa.

In the life cycle of plasmodium, a female anopheles mosquito (the definitive host) transmits a motile infective form (called the sporozoite) to a vertebrate host such as a human (the secondary host), thus acting as a transmission vector. A sporozoite travels through the blood vessels to liver cells (hepatocytes), where it reproduces asexually (tissue schizogony), producing thousands of merozoites. These infect new red blood cells and initiate a series of asexual multiplication cycles (blood schizogony) that produce 8 to 24 new infective merozoites, at which point the cells burst and the infective cycle begins anew(Schlagenhauf-Lawlor). Other merozoites develop into immature gametes, or gametocytes. When a fertilized mosquito bites an infected person, gametocytes are taken up with the blood and mature in the mosquito gut. The male and female gametocytes fuse and form zygotes (ookinetes), which develop into new sporozoites. The sporozoites migrate to the insect's salivary glands, ready to infect a new vertebrate host. The sporozoites are injected into the skin, alongside saliva, when the mosquito takes a subsequent blood meal (Cowman et al, 2012.)

Only female mosquitoes feed on blood; male mosquitoes feed on plant nectar, and thus do not transmit the disease. The females of the anopheles genus of mosquito prefer to feed at night. They usually start searching for a meal at dusk, and will continue throughout the night until taking a meal (Arrow et al, 2004). Malaria parasites can also be transmitted by blood transfusions, although this is rare (Owusu-Ofori et al, 2010.)

Malaria infection develops via two phases: one that involves the liver (exoerythrocytic phase), and one that involves red blood cells or erythrocytes (erythrocytic phase). When an infected mosquito pierces a person's skin to take a blood meal, sporozoites in the mosquito's saliva enter the bloodstream and migrate to the liver where they infect hepatocytes, multiplying asexually and asymptomatically for a period of 8–30 days (Bledsoe 2005.)

After a potential dormant period in the liver, these organisms differentiate to yield thousands of merozoites, which, following rupture of their host cells, escape into the blood and infect red blood cells to begin the erythrocytic stage of the life cycle. The parasite escapes from the liver undetected by wrapping itself in the cell membrane of the infected host liver cell (Vaughan et al, 2008)

Within the red blood cells, the parasites multiply further, again asexually, periodically breaking out of their host cells to invade fresh red blood cells. Several such amplification cycles occur. Thus, classical descriptions of waves of fever arise from simultaneous waves of merozoites escaping and infecting red blood cells.

Some p.vivax sporozoites do not immediately develop into exoerythrocytic-phase merozoites, but instead produce hypnozoites that remain dormant for periods ranging from several months (7–10 months is typical) to several years. After a period of dormancy, they reactivate and produce merozoites. Hypnozoites are responsible for long incubation and late relapses in p.vivax infections, although their existence in p.ovale is uncertain (Richter et al, 2010.)

The parasite is relatively protected from attack by the body's immune system because for most of its human life cycle it resides within the liver and blood cells and is relatively invisible to immune surveillance. However, circulating infected blood cells are destroyed in the spleen. To avoid this fate, the p.falciparum parasite displays adhesive proteins on the surface of the infected blood cells, causing the blood cells to stick to the walls of small blood vessels, thereby sequestering the parasite from passage through the general circulation and the spleen. The blockage of the microvasculature causes symptoms such as in placental malaria. Sequestered red blood cells can breach the blood–brain barrier and cause cerebral malaria.

In areas with stable malaria transmission, due to protracted exposure to infectious bites, partial protective immunity to clinical malaria is gradually acquired with increasing age. Severe p.falciparum malaria is thus predominantly a childhood disease. There is however one exception to this general rule: pregnancy-associated malaria (PAM). Despite their semi-immune status, women become more susceptible to malaria upon pregnancy. The parasite interferes with transmission of vital substances through the fetal placenta, often resulting in stillbirth, spontaneous abortion, or dangerously low birth weight.

Pregnancy-associated malaria (PAM) or placental malaria is a presentation of the common illness that is particularly life threatening to both mother and developing fetus. Clinical features of infection during pregnancy vary with the degree of preexisting immunity and thus the epidemiological setting. Although all pregnant women may be at risk of malaria, its complications are greatest in those with modified PAM is caused primarily by infection with p.falciparum , the most dangerous of the five species of malaria-causing parasites that infect humans. During her first pregnancy, a woman faces a much higher risk of contracting malaria and of associated complications. Prevention and treatment of malaria are essential components of prenatal care in areas where the parasite is endemic. . In endemic areas, approximately 25 million pregnancies are at risk of P. falciparum infection every year, and 25% of these women have evidence of placental infection at the time of delivery. Each year between 100 000 to 300 000 infant deaths may be attributable to maternal malaria in Africa. Severe maternal anemia, prematurity, and low birth weight contribute to more than half of these deaths.

The pathophysiological processes preceding adverse outcomes in PAM are initiated by the accumulation of p.falciparum infected red blood cells (pRBCs) in placental intervillous spaces, causing inflammatory responses and deposition of fibrinoid material. Adhesive interactions between parasite-encoded

erythrocyte surface antigens and intervillous host receptors such as chondroitin sulphate A (CSA), hyaluronic acid (HA), and non-immuneimmunoglobulins (Igs) are believed to be involved in the sequestration process. The exact details of how sequestration causes LBW are unknown. Local inflammatory immune responses in the infected placenta may induce early labour. IUGR appears to be related to reduced nutrient transport to the foetus due to high parasite and inflammatory cell density. Maternal anemia may also independently contribute to IUGR, most likely via a reduction in oxygen transport to the fetus.

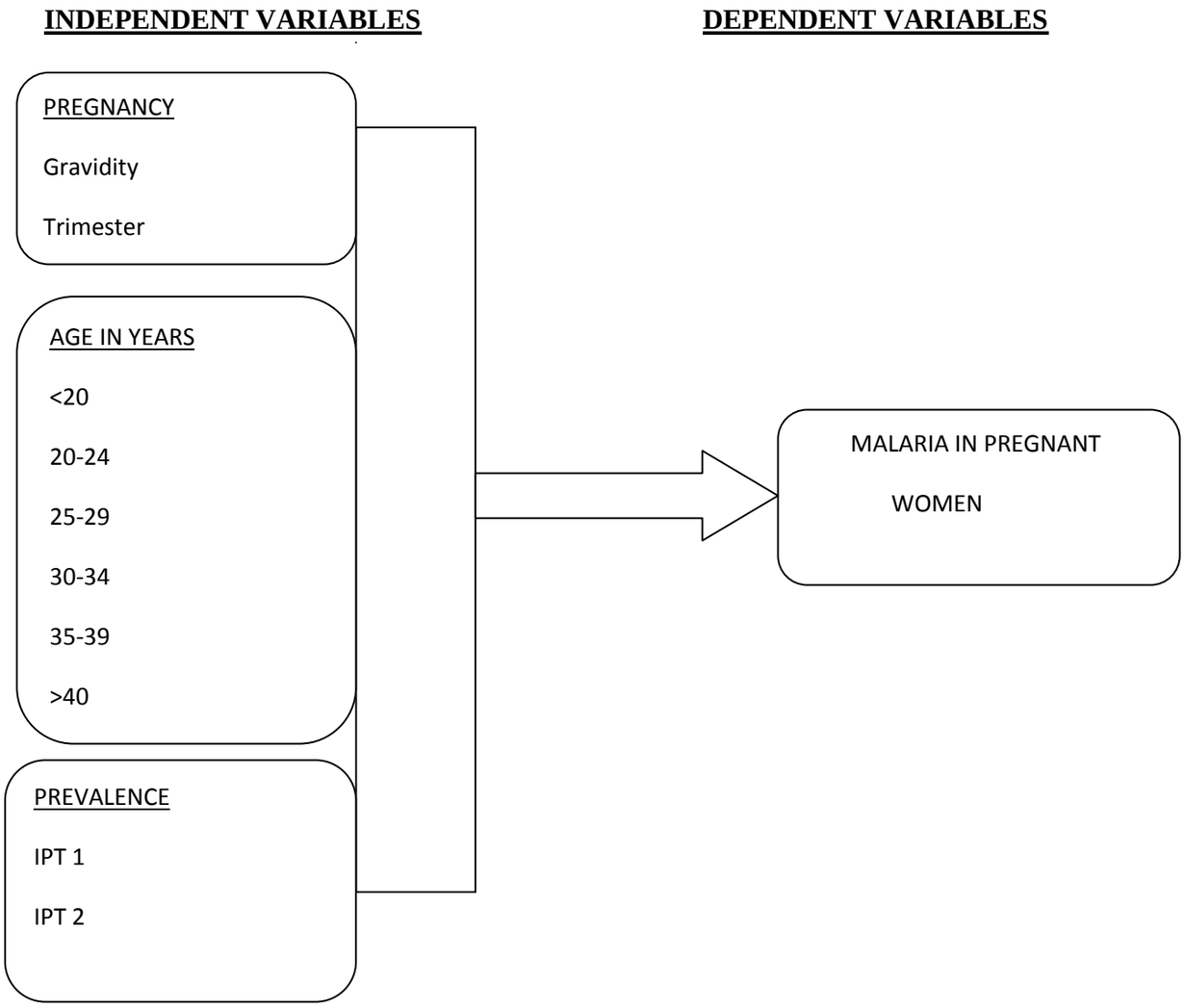
In Uganda, the overall burden of malaria is high and its adverse outcomes to the infected mother and the unborn child are widespread. There is growing awareness that pregnancy-associated malaria is also of importance in areas of low and seasonal transmission worldwide. Although Uganda is regarded as being a malaria-endemic region, the transmission level varies considerably across the country.

1.2 PROBLEM STATEMENT

Pregnant women are more susceptible to malaria compared to their non-pregnant women counterparts. This may be attributed to their reduced immunity during pregnancy. Malaria in pregnancy is a major risk to both the mother and the fetus. In endemic areas, approximately 25 million pregnancies are at risk of P. falciparum infection every year, and 25% of these women have evidence of placental infection at the time of delivery (Guyatt et al, 2004.) Each year between 100 000 to 300 000 infant deaths may be attributable to maternal malaria in Africa (Murphy et al, 2001.)

It has been estimated that MIP in settings with stable malaria transmission in Africa is potentially responsible for up to 70% of IUGR and 36% of preterm delivery (Steketee et al, 2001.) Despite the use of various interventions to reduce the occurrence of malaria in pregnancy, the prevalence of this condition is still high. Therefore this study is aimed at finding out the frequency at which this condition occurs in KIUTH and the outcomes encountered due to it

1.3 CONCEPTUAL FLAME WORK



1.4 OBJECTIVE OF THE STUDY

1.4.1 MAIN OBJECTIVE

The aim of this study is to determine the prevalence of malaria in pregnant women who attended KIUTH between January 2015 and December 2015.

1.4.2 SPECIFIC OBJECTIVES

i) To determine the prevalence of malaria in pregnant women in KIU TH for the period under study
ii) To assess the age group with the highest prevalence of malaria in pregnant women in KIU-TH for the period under study
iii) To assess the documented outcomes of malaria in pregnant women in the affected individuals for the period under study

1.5 RESEARCH QUESTIONS

1) What is the prevalence of malaria in pregnant women in KIUTH
2) What is the age group with the highest prevalence of malaria of malaria in pregnant women in KIU TH
3) What are the documented out comes of malaria in pregnant women among pregnant women attending at KIU -TH

1.6 SIGNIFICANCE OF THE STUDY

This study is of importance in providing current information on prevalence of malaria in pregnant women who attend in KIUTH. It will give information on the various preventive measures that have been taken in the hospital to reduce the number of cases of the condition. This will aid in assessing the quality of obstetric care given to mothers on KIUTH. It will also aid in improving future management of pregnant women with malaria in order to prevent any complications.

1.7: JUSTIFICATION OF THE STUDY

This study provides information regarding the prevalence of malaria in pregnant women who attend in KIUTH and its effects. This information would be important in evaluating the quality of care given to pregnant women to prevent or treat it. Therefore various measures may be taken to reduce the frequency of occurrence of the condition thereby avoiding the adverse effects that may have otherwise occurred.

CHAPTER TWO

LITRATURE REVIEW

2.1: Introduction

The WHO estimates that in 2010 there were 219 million cases of malaria resulting in 660,000 deaths, equivalent to roughly 2000 deaths every day (Nadjm et al, 2012). Using a different set of predictive models to estimate mortality, a 2012 study determined the number of documented and undocumented deaths in 2010 to be 1.24 million. The majority of cases (65%) occur in children under 15 years old. About 125 million pregnant women are at risk of infection each year; in Sub-Saharan Africa, maternal malaria is associated with up to 200,000 estimated infant deaths yearly. There are about 10,000 malaria cases per year in Western Europe, and 1300–1500 in the United States. About 900 people died from the disease in Europe between 1993 and 2003. Both the global incidence of disease and resulting mortality has declined in recent years. According to the WHO, deaths attributable to malaria in 2010 were reduced by over a third from a 2000 estimate of 985,000, largely due to the widespread use of insecticide-treated nets and artemisinin-based combination therapies.

Malaria is presently endemic in a broad band around the equator, in areas of the Americas, many parts of Asia, and much of Africa; in Sub-Saharan Africa, 85–90% of malaria fatalities occur. The Malaria Atlas Project aims to map global endemic levels of malaria, providing a means with which to determine the global spatial limits of the disease and to assess disease burden. This effort led to the publication of a map of p.falciparum endemicity in 2010. As of 2010, about 100 countries have endemic malaria. Every year, 125 million international travelers visit these countries, and more than 30,000 contract the disease.

The geographic distribution of malaria within large regions is complex, and malaria-afflicted and malaria-free areas are often found close to each other. Malaria is prevalent in tropical and subtropical regions because of rainfall, consistent high temperatures and high humidity, along with stagnant waters in which mosquito larvae readily mature, providing them with the environment they need for continuous breeding. In drier areas, outbreaks of malaria have been predicted with reasonable accuracy by mapping rainfall. Malaria is more common in rural areas than in cities. In contrast, malaria in Africa is present in both rural and urban areas, though the risk is lower in the larger cities (WHO 1999.)

2.1.2 Prevalence of malaria in pregnancy

Malaria is the leading cause of morbidity and mortality in Uganda. Malaria has historically been a very serious health problem and currently poses the most significant threat to the health of the people of Uganda (Uganda Ministry of Health). Malaria currently accounts for: 25% of all outpatients visits at the health facilities, 20% of hospital admissions, 9.14% of inpatients deaths, a case-fatality rate of 35% (which is an under estimate, since many malaria cases go unreported especially those in areas inaccessible to health facilities) and nearly 60% of miscarriages or abortions in the country. A study done by Fatuma at Mulago hospital in 2010 on malaria in pregnancy revealed a prevalence of 20% (Fatuma et al, 2010.)

The most common malaria parasite is p.falciparum. The malaria vectors in Uganda are anopheles gambiae and and funestus both of which are indoor feeders. Falciparum malaria is the major cause of anemia in pregnancy especially in primigravidae. Some studies have shown prevalence of more than 80 per cent of primigravidae with severe anemia having malaria parasites in their blood. In one of such

studies malaria hyper reactive splenomegaly seen in pregnant women was also associated with high parasite density and low hemoglobin (Ndyomugyenyi et al, 1999.)

Malaria morbidity is high in the country because of perennial transmission. Highland areas like in Eastern and Western Uganda which had unstable malaria before 1997 now report high malaria morbidity as a result of increased rainfall due to El Nino Southern oscillation effects. These areas have experienced malaria epidemics in the last four years. Some studies have shown positive correlation between rainfall anomaly and vector density one month later. In highland population in Uganda, epidemic malaria appears to occur at extremely low inoculation rates. In addition to this, there is increased resistance to classical malarial drugs (Kilian et al, 1999.)

Uganda's high rates of malaria disproportionately affect young children and pregnant women in rural areas who experience extreme poverty, limited access to healthcare services, and lack of education. Malaria has negative health and economic effects, and restricts the productivity of our population. Increased Insecticide Treated Bed Net (ITN) coverage and education, improved access too and delivery of treatment and emergency control of malaria are essential to control malaria in Uganda.

2.1.3:The age group most affected

Preg**n**ant women are at high risk of malaria. Non-immune pregnant women risk acute and severe clinical disease, resulting in up to 60% fetal loss and over 10% maternal deaths, including 50% mortality for severe disease. Semi-immune pregnant women with malaria infection risk severe anemia and impaired fetal growth, even if they show no signs of acute clinical disease. An estimated 10,000 of these women and 200,000 of their infants die annually as a result of malaria infection during pregnancy. HIV-infected pregnant women are at increased risk.

Women in first and second pregnancies are noted to have higher parasitic concentration than others with greater than two pregnancies. However, with successive pregnancies, the frequency and severity of the disease is known to decline. Studies have also revealed an association between malaria infection rates and the period of pregnancy. An epidemiological study conducted in several countries in Africa, revealed an interesting pattern of the infection. Higher rates were observed during the first few weeks of pregnancy, which peaked during the second trimester. The rates declined in the last trimester and after pregnancy (Brabin, 2004.)

Recent studies focused on one or a few features of malaria, such as timing and/or frequency (Huynh et al, 2008.), or the effect of a single infection early in pregnancy (when weekly screening was routinely provided throughout pregnancy), and have produced inconsistent results. Several investigations found that LBW risk was associated specifically with malaria infections occurring in early pregnancy (Praise et al, 2003.)

MIP is thought to affect birth outcomes through two mechanisms, intrauterine growth restriction (IUGR) and preterm delivery, which might - at least partially – explain these discordant findings. It has been estimated that MIP in settings with stable malaria transmission in Africa is potentially responsible for up to 70% of IUGR and 36% of preterm delivery (Steketee et al, 2001.) The former has been consistently

associated with placental infection, while the latter appears to correlate with systemic manifestations of malaria infection in the mother. However, accurate determination of gestational age is required to distinguish IUGR from preterm delivery—a determination that is difficult to make in resource-constrained settings, where tools such as ultrasound are rarely available. As a result, evidence of the relative importance of IUGR versus preterm delivery due to MIP remains limited.

2.1.4: outcomes of malaria

Malaria is endemic in the poorest countries of the world and has often been labeled a disease of poverty. Several studies attempted to make the link between malaria and socio-economic status (SES) using a number of variables for measuring SES. Household income, occupation type, gender, and assets have all been used as proxies for assessing SES in many developing countries; these different measurement approaches make comparisons problematic. However, studies have shown that there is indeed an association between malaria occurrence and SES, as it relates to prevention and access to treatment of malaria (Worrall et al, 2003.) Poverty level also influences the incidence of malaria.

Poor malaria-stricken family may spend up to 25% of income on malaria treatment and prevention, and loose household incomes through absenteeism from work. It is estimated that workers suffering from a malaria bout can be incapacitated for 5-20 days. A study in Apac, Kampala,and Rukungiri Districts showed that malaria was responsible for 54%, 33% and 50% respectively of absenteeism from work per month in the above districts (Ministry of Health, 2001.)

CHAPTER THREE

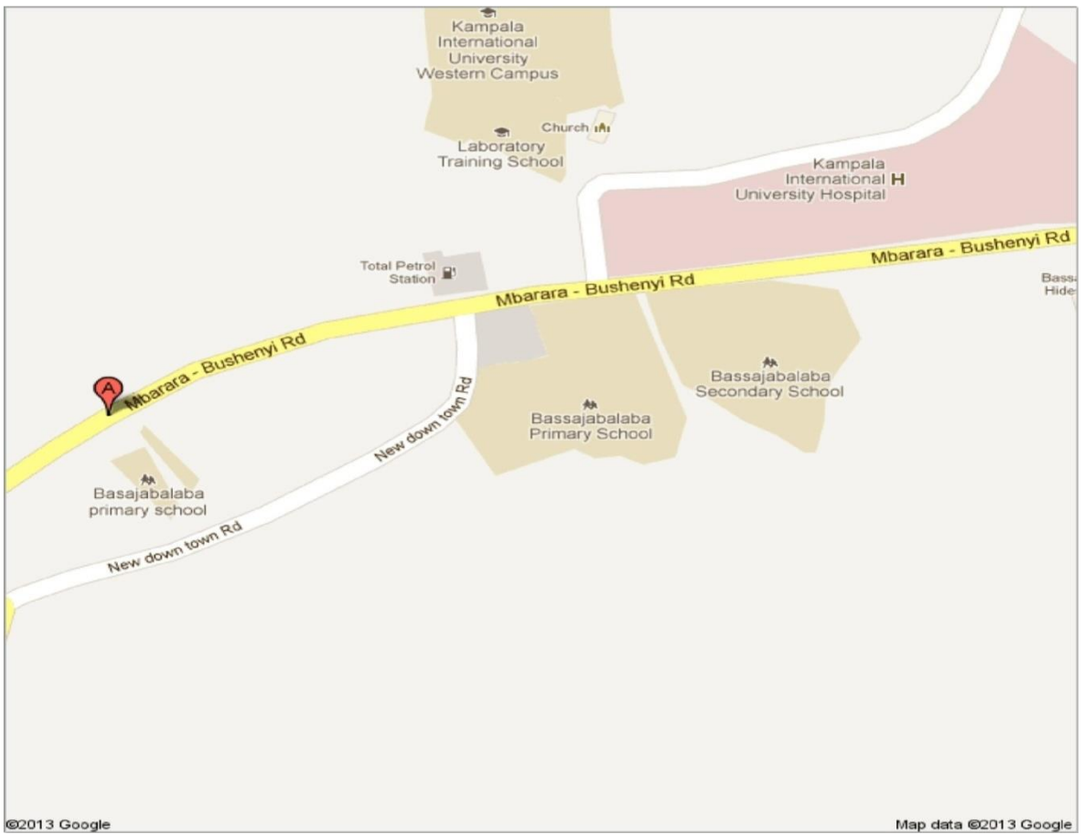
3.0 METHODS AND MATERIALS

This chapter involves the description of the data collection tools, the study design that was used, the study area in which the research was carried out and the methods that were used in data collection, analysis, editing and pretesting and the ethical consideration was taken into account and possible study limitations that would be encountered.

3.1 Research design

This was a cross sectional retrospective study to determine the prevalence of malaria in pregnant women who attended KIUTH between January 2015 to December 2015. It involved obtaining records on the total number of pregnant women who attended KIUTH obstetric ward and antenatal clinic from January 2015 to December 2015 and determining how many out of this were diagnosed with the condition.

3.2 study area:



KIU teaching hospital from which the research was done is located in in Bushenyi District which is in the Western part of Uganda (coordinates of the district are: 00 32S, 30 11E), Ankole sub region; about 300 kilometers from Kampala city. Bushenyi District is bordered by Rubirizi District to the northwest, Buhweju District to the northeast, Sheema District to the east, Mitooma District to the south and Rukungiri District to the west.

In 2002, the district, as configured after July 2010, had a population of about 205,700 according to the national census bureau. The population growth rate in the district was estimated at 3.0%. It is estimated that the population of the district in 2010 was approximately 260,600.

KIU Teaching Hospital is located in the largest town in the district, Ishaka, which is located 75 kilometres (47 mi), by road, northwest of Mbarara. The hospital houses the Department of Surgery, Medicine, Obstetrics and Gynecology, Pediatric, Psychiatry, OPD and casualty

3.3 Study population

This included pregnant women who attended KIUTH antenatal clinic and those who were admitted to the labour ward between January2015 and December 2015.

3.4 Sample size estimation

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

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

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

n is the sample size,

D is the precision of 5% =0.05,

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

A sample size of 125 was found by using the formula above. However only 53 cases were obtained in this study.

3.5 Inclusion criteria

The criteria that was employed to determine those who would be included in the study included:

a) Pregnant women who attended antenatal clinic during the period of the study
b) Pregnant women who were admitted to the labour ward.

3.6 Exclusion criteria

a) Pregnant women who were admitted due to other febrile illnesses in the admitted to the labour ward.

b) Pregnant women who attended antenatal clinic for their routine pregnancy checkup during the period of the study.

3.7 Data collection tools

Data extraction forms were used to collect the data from the KIUTH records office.

3.8 Data analysis and presentation

Raw data was collected and computed using SPSS software version 16.0 for windows. Frequencies were used to analyze and the data was presented in form of tables, charts and graphs.

3.9 Expected limitation

Inaccurate recording of data in files would interfere with the calculations which were made, and hence the results.

3.10 Ethical considerations

i. An introductory letter was sought from the SAHS administrator.
ii. All results were treated with utmost confidentiality by ensuring that only authorized people have access to them

CHAPTER FOUR

COLLECTED DATA

Table 1 :AGE

< 20 years	5	9.4
20-24 years	20	37.7
25-29 years	13	24.5
30-34 years	12	22.6
35-39 years	2	3.7
>40 years	1	1.8

Table 2: GRAVIDITY

Gravida 1	12	22%
Gravida 2	16	30%
Gravida 3	11	21%
Gravida 4	11	21%
>Gravida 4	3	6%

Table 3: TRIMESTER

1ST trimester	17	32.1%
2nd trimester	17	32.1%
3rd trimester	19	35.8%

Table 4; MATERNAL COMPLICATIONS

None	48	91%
Severe anemia	5	9%

Table 5: FETAL COMPLICATIONS

Preterm	2	4%
Low birth weight	3	5%
Fetal demise	1	2%
None	47	89%

Table 6 :INTERMITTENT PREVENTIVE TREATMENT .1

NO	25	47.2%
YES	28	52.8%

Table 7; INTERMITTENT PREVENTIVE TREATMENT .2

NO	39	73.6%
YES	14	26.4%

Table 8; MONTHLY

January	6	11.3%
February	5	9.4%
March	3	5.6%
April	7	13.2%
May	4	7.5%
June	8	15%
July	3	5.6%
August	4	7.5%
September	2	3.7%
October	3	5.6%
November	5	9.4%
December	3	5.6%

DATA ANALYSIS AND PRESENTATION

AGE OF AFFECTED MOTHERS

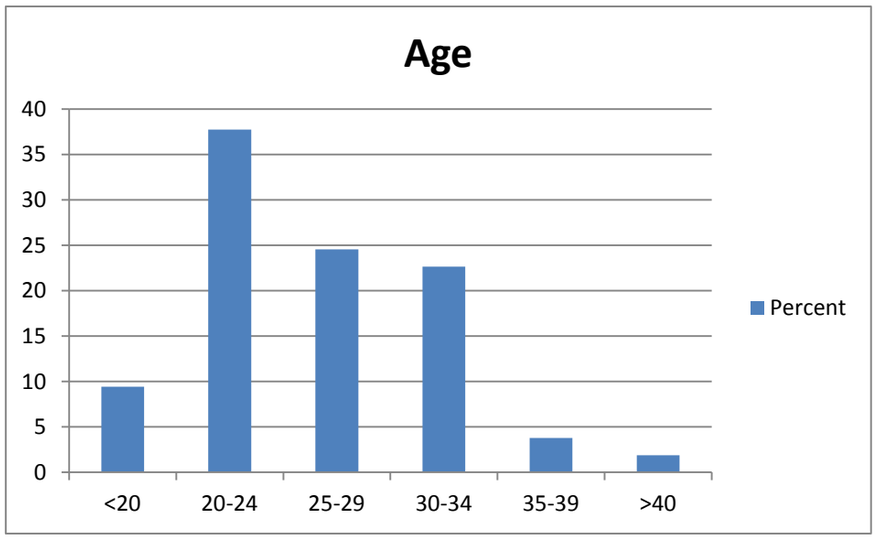


Table 9**: graphical representation of the age of affected mothers**

The age group which was highly affected by malaria in pregnancy was between 20 to 24 years (37.7%), while those above 40years had the lowest infection rate.

GRAVIDITY OF THE AFFECTED MOTHERS

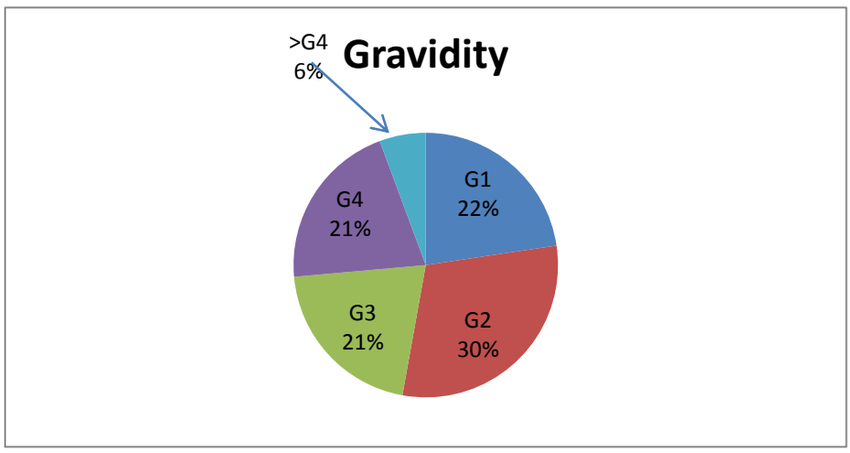


Figure 1**: representation of gravidity of affected mothers.**

The women who had their second pregnancy had a higher percentage of infection rates (30%), followed by the primigravida (22%). Then lowest rate was seen in women who had had four or more pregnancies.

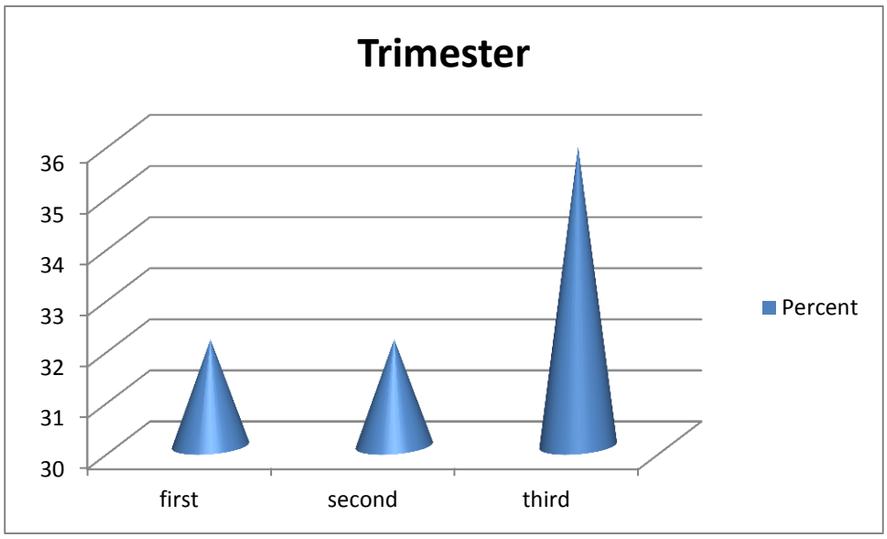


Table 10: representation of trimester of pregnancy during infection

Women in their third trimester were found to be more affected (35.8%) than those in their first or second trimester of pregnancy.

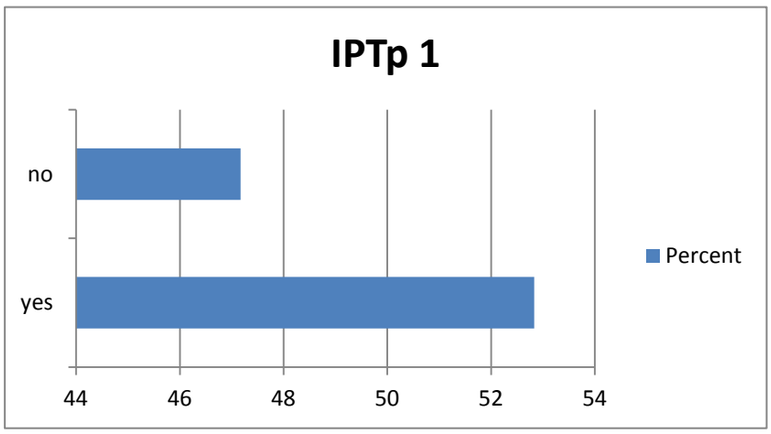


Table 11: representation of women who took IPT 1

Most of the mothers had taken the first dose of sulfadoxin-pryrimethamine (52.8%).

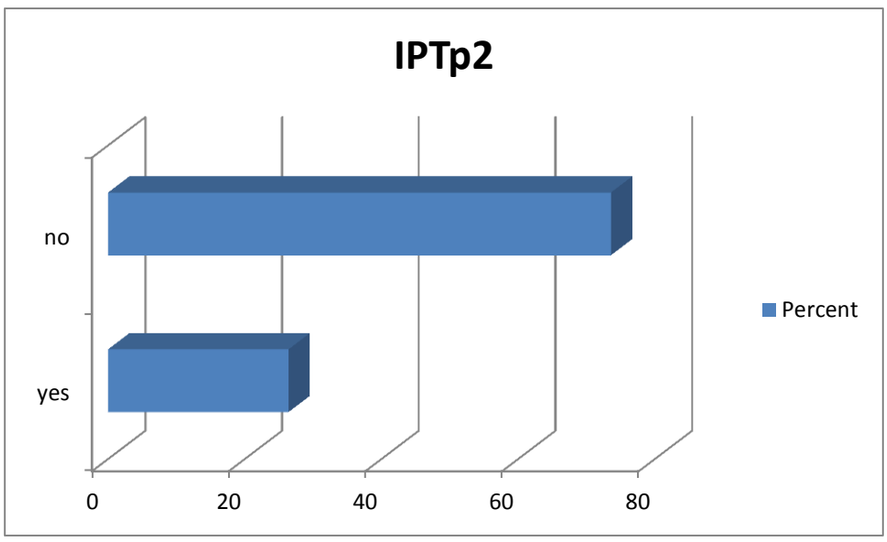


Table 12: representation of women who took IPT 2

Most of the affected mothers had not yet taken the second dose of sulfadoxine-pyrimethamine. Only (26.4%)

had taken the prophylaxis.

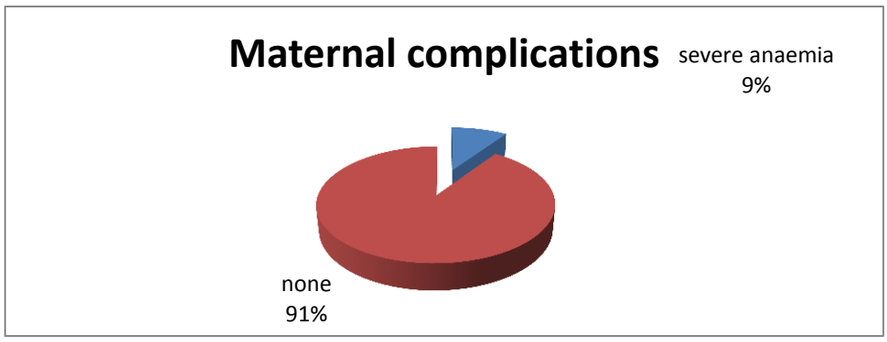


Figure 2**: representation of complications experienced by the affected mothers**

Only 9.4% of the affected mothers developed the complication of severe anemia. The rest of the mothers did not experience any complication as a result of malaria in pregnancy.

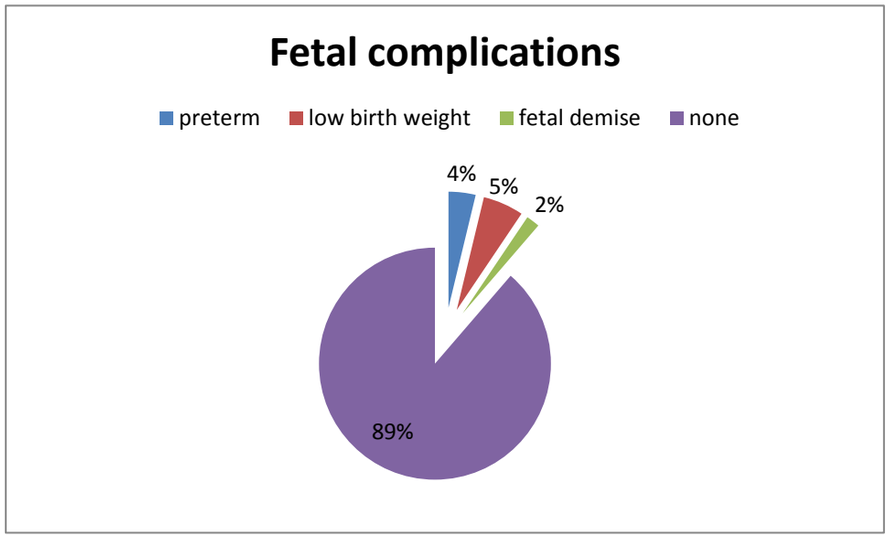


Figure 3: representation of fetal complications experienced

Low birth weight was the fetal complication with the highest rate (5%). Other complications included preterm birth (4%), and fetal demise (2%). However no other complications were observed.

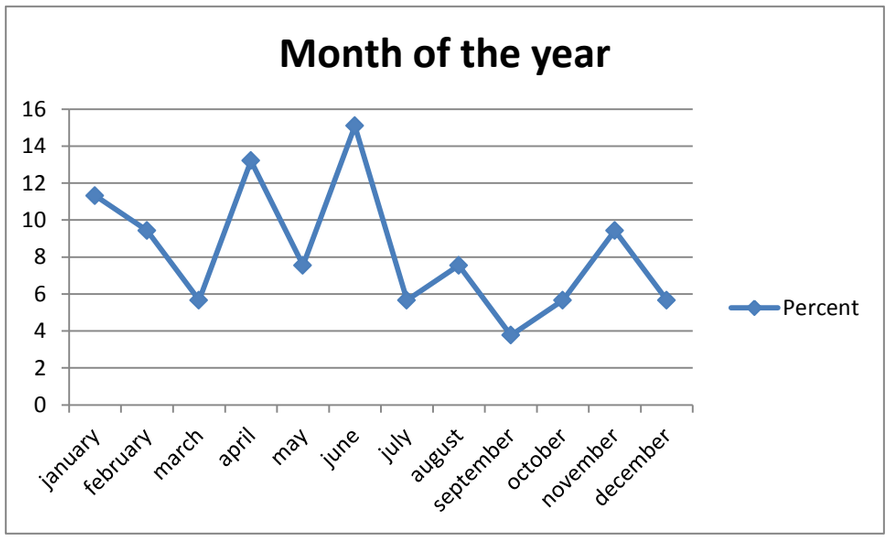


Figure 4**: representation of infection rates though out the year**

The highest rate of cases was reported in June (15%), while the lowest rate was in September (4%).

The total number of admissions for malaria in pregnancy for the year 2015 was 53. The total number of admissions in the obstetric ward was 974 for the same year. Therefore the prevalence of malaria in pregnancy for KIUTH for that year was found to be 54 cases per 1000 pregnant women admitted in KIUTH.

months	Malaria in pregnancy admissions	Total obstetric admissions
January	6	96
February	5	54
March	3	70
April	7	93
May	4	96
June	8	87
July	3	80
August	4	66
September	2	86
October	3	112
November	5	69
December	3	65
TOTAL	**53**	**974**

Table 13:number of malaria in pregnancy cases throughout the year

CHAPTER FIVE

5.1 DISCUSSION

Following the research done in KIUTH it was found that the prevalence of malaria in pregnancy among pregnant women who attended KIUTH was 53 cased per 1000 pregnant women (5.4%). A previous research at Mulago hospital showed that the prevalence in that hospital for the same condition was about 200 cased per 1000 pregnant women. The difference in prevalence might have been due to difference in the population of the areas surrounding the two hospitals, with KIUTH being at a disadvantage. The lower rates might have also been due to KIUTH being a private hospital and so fewer patients are received due to lack of finances needed for payment. Despite the rate being lower in KIUTH, preventive measures need to be strengthened in order to eliminate the disease.

According to the research, the age group which was highly affected by the condition was between 20 and 24 years (37.7%), followed by those between 25 and 29 years, with the lowest rates in women above 40 years, therefore younger women were more affected than their counterparts which. However this pattern may be due to the higher rate of pregnancies or fertility in the younger age group than in older ages.

Women who were on their second pregnancy had the highest prevalence of 30%, followed by the primigravidas. Much lower rates were seen in those with a higher number of pregnancies. This is consistent with previous studies which showed that women in their first or second pregnancy were more affected by malaria in pregnancy than those in subsequent pregnancies (Brabin, 2004.) This occurrence might be due to the acquiring of immunity with subsequent pregnancies, and so women with a higher gravidity are affected less.

The research showed that women in the third trimester of pregnancy were affected more (35.8%) than those in the first or second trimester. These results were contradictory to those of a previous research. An epidemiological study conducted in several countries in Africa, revealed an interesting pattern of the infection. Higher rates were observed during the first few weeks of pregnancy, which peaked during the second trimester. The rates declined in the last trimester and after pregnancy (Brabin, 2004.) Women in the first trimester of pregnancy are usually not given the intermittent preventive therapy due to risk of teratogenicity to the fetus. Therefore a higher rate of malaria in pregnancy would have been expected in such women as compared to those in the third trimester who are likely to have taken the two doses already.

Most of the women had taken the first dose of intermittent preventive therapy (52.8%). However, only a few (26.4%) had taken the second dose. IPT with SP has been shown to reduce placental malaria even in areas with up to 50% reported SP resistance. WHO therefore recommends all countries with highly endemic malaria and less than 50% reported SP resistance to adopt IPT/SP as a policy. However, growing resistance of malaria parasites to SP in many regions, combined with the changing epidemiology of malaria, indicate that other prevention approaches must be strengthened. This explains why some women who had taken both doses, still developed malaria.However some of the women could have not taken the prophylaxis at all since they had never attended the antenatal clinic or never complied to take the drug although given to them. Records in the antenatal clinic showed that all women who attended the clinic at the scheduled time were given the prophylaxis as recommended. Women who were excluded from the intermittent prophylactic therapy were those who were HIV positive and on septrin.

The research revealed that only 9% of the affected mothers developed complications, while the rest did not develop any, and were discharged in a good condition. The maternal complication that was noted was severe anemia. The fetal complications which were encountered were low birth weight (5%), preterm birth (4%), and fetal demise (2%). Most of the pregnant mothers were discharged before delivery, and so the results may not reflect the true account of the fetal complications that may have been observed later on. Previous literature shows that non-immune pregnant women risk acute and severe clinical disease, resulting in up to 60% fetal loss and over 10% maternal deaths, including 50% mortality for severe disease. Semi- immune pregnant women with malaria infection risk severe anemia and impaired fetal growth, even if they show no signs of acute clinical disease. An estimated 10,000 of these women and 200,000 of their infants die annually as a result of malaria infection during pregnancy. HIV-infected pregnant women are at increased risk.

Some of the limitations experienced during this research included having a smaller sample size since the population being studied was smaller; therefore the estimated size was not achieved. Some of the outcomes of the patients might have not been accurate since they were not followed up, and got discharged before delivery. However, the data which was acquired was used to calculate an estimated prevalence.

5.2 CONCLUSION

The research revealed that the prevalence of malaria in pregnancy in KIUTH was 53 cased per 1000 pregnant women, which is low compared to previous literature. The age group which was most affected was between 20 to 24 years.

Women in their second pregnancy had the highest rate of the condition (30%). Those in their third trimester were also the most affected (35.8%). Most women had taken the first dose of intermittent preventive therapy (52.8%) but only few had taken the second dose (26.4%).

The complications which were encountered were severe maternal anemia (9.4%), low birth weight (5%), preterm birth (4%), and fetal demise (2%).

5.3 RECOMMENDATIONS

- The ministry of health should hold campaigns to educate the community about malaria in pregnancy, its complications and how it can be prevented.
- Women should be encouraged to attend antenatal clinics where they can receive prophylaxis for malaria in pregnancy.
- The prophylaxis should be taken under direct observation of the health worker so as to ensure that recommended doses are taken adequately.
- Pregnant women and women of child bearing age should be advised on the use of insecticide treating nets as a method of prevention of malaria in pregnancy.
- People’s attitudes should be geared towards knowing that it is their responsibility to reduce the prevalence of malaria in pregnancy in the community by making preventive measure such as vector control by draining stagnant water and clearing bushes around their homes

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APPENDICES.

APPENDIX I |: DATA EXTRACTION FORM

N^{O}	Age	gravidity	Trimester	Intermittent preventive therapy 1	Intermittent preventive therapy 2	Maternal complications	Fetal complications

APPENDIX II: WORK PLAN

ACTIVITY	TIME FRAME	REQUIREMENTS	PERSON RESPONSIBLE
Proposal writing	FEBRUARY 2017	Computer, stationery, internet access	Researcher
Presentation of proposal, Corrections	March-April 2017		Researcher Supervisor
Letter from SAHS Administrator	April 2017		Researcher
Data collection	May 2017	KIUTH Record Files	Researcher / assistant
Data analysis and presentation of results	May-June 2017	Stationery, computer	Researcher
Research Defence	June 2017	Research Book	Researcher
Printing and Submission of Corrected Research Report	June 2017	Stationery, computer	Researcher

APPENDIX III: BUDGET

ITEM	UNIT	UNIT COST (UGX)	TOTAL (UGX)
Pens	06	700	4,200
Pencils	03	400	1200
Paper	02 reams	13,500	27,000
Secretarial work	60 pages	500	30,000
Printing	60 pages	500	30,000
Internet bundles	04 months	25,000	100,000
Airtime		20,000	20,000
Research assistant			100,000
Consumables			30,000
Miscellaneous			100,000
GRAND TOTAL			**442,400**