

**PREVALENCE OF MALARIA AMONG
PREGNANT MOTHERS ADMITTED TO
ARUA REGIONAL REFERRAL HOSPITAL
MATERNITY WARD**

BY

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**A RESEARCH REPORT SUBMITTED TO THE SCHOOL OF
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DECLARATION

I hereby declare that this research project has never been submitted or produced for any award in any university or any other institution and is entirely a result of my research effort. Use of literature from other sources in reference has been accredited to its rightful authors.

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I would like to thank the entire staff of KIU-western campus and more so the faculty of allied health sciences who offered me relevant Knowledge and skills that I am proud of to this date.

DEDICATIONS

This work is lovingly dedicated to all the mothers of child bearing age in Uganda. Special thanks to My Parents (RIP), my entire family and friends who never stopped encouraging me to continue finish this award.

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ABBREVIATIONS

WHO	world health organization
LBW	low birth weight
RBM	Roll Back Malaria
ACTs	Artemisinin Combined Treatment
NGO	Non governmental organization
FAL	Functional Adult Literacy
ANC	ATENATAL CARE
RDTs	Rapid Diagnostic Tests
OPDs	Out Patient department
ITN	<i>Insecticide-treated nets</i>
UBOS	Uganda Bureau of Statistics
SPSS	statistical package for social science

CHAPTER ONE

1.1 Study Background

As many as 3 billion people in endemic areas are at risk of malaria and ~500 million clinical cases occur annually (**Michael et al, 2011**). Between 1 and 3 million annually, largely African infants and young children. Malaria, a protozoan infection transmitted by anopheles mosquitoes, is the most important parasitic disease of humans.

The year 2010 was the date set to achieve universal coverage for all populations at risk of malaria using locally appropriate interventions for prevention and case management, and to reduce the malaria burden by at least 50% compared to the levels in the year 2000 (**WHO, 2011**).

In the light of progress made by 2010, the Roll Back Malaria (RBM) targets were updated in June 2011. The targets are now to reduce global malaria deaths to near zero by end-2015; reduce global malaria cases by 75% from 2000 levels by end-2015; and eliminate malaria by end-2015 in 10 new countries since 2008, including in the WHO European Region.

These targets will be met by: achieving and sustaining universal access to, and utilization of, preventive measures; achieving universal access to case management in the public and private Sectors and in the community (including appropriate referral); and accelerating the development of surveillance systems.

There are four species of malaria parasites which infect humans namely: *Plasmodium falciparum*; *Plasmodium vivax*; *Plasmodium ovale*; and *Plasmodium malariae* (**Uganda ministry of health, 2010**). Of these, *P. falciparum* is the most virulent malaria parasite in the world and also the most common malaria parasite in Uganda. Uganda is home to the most efficient malaria mosquito vectors (**Okello et al, 2006**). Most African countries are "the poorest of the poor", lacking the basic infrastructure and resources necessary to mount sustainable malaria control efforts. Uganda is emblematic of the immense problem that malaria poses for African countries. Malaria is endemic in over 95% of the country, with the highest malaria transmission intensities reported in the world. According to a recent report from the World Health Organization, Uganda has the world's highest malaria incidence, with a rate of 478 cases per 1000 population per year. Malaria is the leading cause of morbidity and mortality in Uganda and is responsible for up to 40% of all outpatient visits, 25% of all hospital admissions and 14% of all hospital deaths by

Uganda Ministry of Health, unpublished. The overall malaria-specific mortality is estimated to be between 70,000 and 100,000 child deaths annually in Uganda, a death toll that far exceeds that of HIV/AIDS.

1.2 Problem statement

Malaria is still among the leading cause of death in Africa especially in sub-Saharan Africa mostly children below 5 years and pregnant women (**David and Heymen, 2004**). It is estimated that malaria causes 250 million cases of fever and approximately one million deaths annually. Malaria is the leading cause of morbidity and mortality in Uganda and is responsible for up to 40% of all outpatient visits, 25% of all hospital admissions and 14% of all hospital deaths by Uganda Ministry of Health, unpublished (**Okello et al, 2006**). The overall malaria-specific mortality is estimated to be between 70,000 and 100,000 child deaths annually in Uganda, a death toll that far exceeds that of HIV/AIDS.

In addition to its effects on pregnant women, malaria infection during pregnancy has severe consequences for the fetus and infant. Malaria infection appears to have the most significant effect on LBW and poor fetal outcomes during the third trimester, but infections earlier in pregnancy may also contribute. LBW is the strongest risk factor for neonatal and infant death, and malaria is thought to be responsible for 62,000-363,000 infant deaths associated with LBW yearly. An estimated 30% of preventable cases of LBW are attributed to malaria. In addition, infants born to women with malaria have approximately 2-3 fold increased risk of anemia.

1.3 Research objectives

To determine the prevalence of malaria infection among pregnant mothers attending out-patient in Arua regional referral hospital between December 2013 and March 2014.

1.3.2 Specific objectives

1. To determine the socio demographic profile of pregnant mother attending out-patient in Arua regional referral hospital between December 2013 and March 2014.
2. To identify the factors that contributes to high prevalence of malaria among pregnant mothers attending out-patient in Arua regional referral hospital between December 2013 and March 2014.

3. To assess the effectiveness of the control and preventive measures being used for malaria control among the pregnant mothers attending out-patient in Arua regional referral hospital between December 2013 and March 2014.

1.4 Research justification

Despite the much efforts from Uganda government, malaria and its complications in pregnancy and young children still remain problems to the Ugandan. Malaria is a serious illness, particularly for pregnant women (**Steketee et al, 1996**). It can result in severe illness or death and affect both the mother and unborn baby. It has been estimated that malaria during pregnancy is responsible for 5–12% of all low birth weight and 35% of preventable low birth weight and contributes to 75 000 to 200 000 infant deaths each year (**Steketee et al, 2001**).

1.4 National malaria burden in Uganda



(UN Population Division; 2012)

Epidemiological profiles:

High transmission (>1 case per 1000 population)	32 700 000	90
Low transmission (0–1 cases per 1000 population)	3 630 000	10
Malaria-free (0 cases)	0	0
Total	36 330 000	

1.5 Arua District as a case

Out of an estimated 800,000 population of Arua district, about 45% suffers from malaria, mainly children under the age of five (MOH Uganda; 2010).

1.6 Research questions

1. What are the factors that contribute to high prevalence of malaria in pregnant women admitted to Arua regional referral hospital maternity ward between December 2013 and March 2014?
2. What are the strategies to control the prevalence of malaria in pregnant women admitted to Arua regional referral hospital maternity ward between December 2013 and March 2014?

CHAPTER TWO

REVIEW OF RELATED LITERATURE

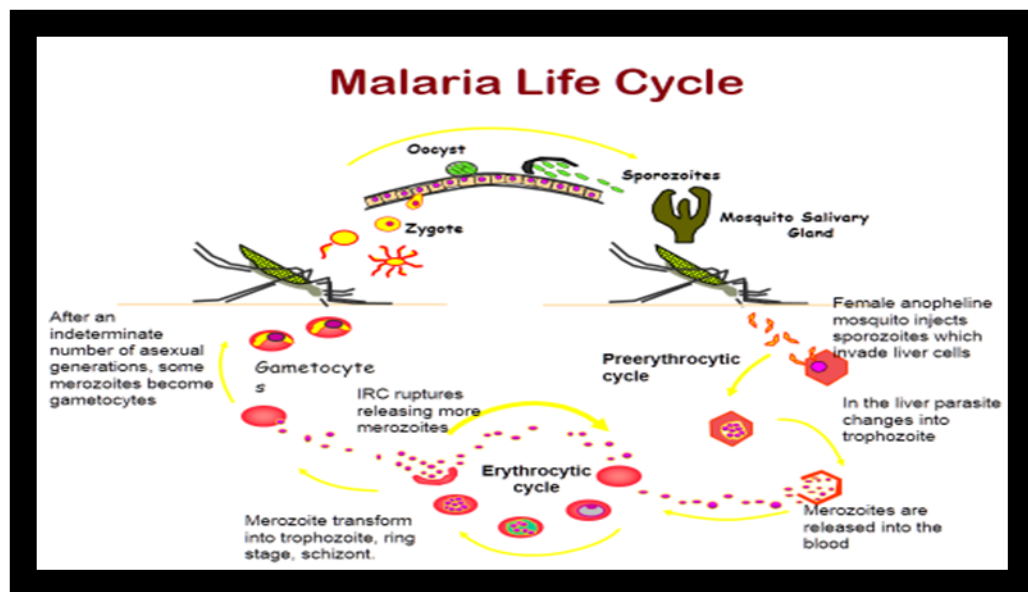
2.1 Introduction

According to the latest WHO estimates, there were about 219 million cases of malaria in 2010 and an estimated 660 000 deaths. Africa is the most affected continent: about 90% of all malaria deaths occur there. Between 2000 and 2010, malaria mortality rates fell by 26% around the world. In the WHO African Region the decrease was 33%. During this period, an estimated 1.1 million malaria deaths were averted globally, primarily as a result of a scale-up of interventions. The six highest burden countries in the WHO African region (in order of estimated number of Cases) are: Nigeria, Democratic Republic of the Congo, United Republic of Tanzania, Uganda, Mozambique and Cote d'Ivoire. These six countries account for an estimated 103 million (or 47%) of malaria cases (WHO; 2010).

2.2 Plasmodium modes of transmission:

Bite of an infective female anopheles mosquito (commonest mode of transmission), transfusion of blood infected with malaria parasites and vertical transmission from mothers to foetus

2.3 Malaria life cycle and transmission



2.4 Clinical Manifestations of Malaria

Common signs of uncomplicated malaria **manifestations occur in two phases:**

1. Febrile paroxysm begins early afternoon with three successive session; cold, hot sweating, fever (40°C-40.6°C).
2. Anemia, splenomegaly in acute malaria (UCG; 2012).

2.5 Optimum conditions for malaria transmission:

High humidity, ambient temperature between 20 and 30°C, transmission does not occur at temp. <16°C or >33°C, and at an altitude >2000m.

2.6 Malaria incubation period

Following the infective bite by the Anopheles mosquito, a period of time (the "incubation period") goes by before the first symptoms appear. The incubation period in most cases varies from 7 to 30 days. The shorter periods are observed most frequently with *P. falciparum* and the longer ones with *P. malariae*

2.7 Common Signs of Complicated Malaria

Convulsions or fits within the last two days or at present, vomiting everything. Altered mental state (lethargy, drowsiness, unconsciousness or confusion); prostration or extreme weakness (unable to stand or sit without support). Severe respiratory distress or difficulty in breathing; severe anemia (Severe pallor of palms and mucous membranes); severe dehydration (sunken eyes, coated tongue, lethargy, inability to drink) (Davidsons Medicine; 20010).

2.8 Differential Diagnosis of Malaria

Typhoid fever, Urinary tract infections, Brucellosis, Hemorrhagic fevers, Meningitis and Tuberculosis (Toyes Medicine; 2005).

2.9 Diagnosis Of Malaria

Clinical diagnosis involves history & physical examination and laboratory investigations.

Laboratory investigations is the gold standard which involves thick and thin blood films for detection of quantification and species of parasites respectively.

2.10 Malaria treatment

2.10.1 Uncomplicated malaria: The recommended first line medicine is

Artemether/Lumefantrine. Artesunate + Amodiaquine are the alternative that may be used from second semester. When Artemether/Lumefantrine is not available. The recommended second line medicine is oral quinine for all patients.

2.10.2 Severe and complicated malaria: Parenteral quinine is the recommended treatment for the management of severe malaria for all Patients. Parenteral Artemisinin derivatives may be used if quinine is contraindicated or not available.

Children below 4 months of age: Artemether/Lumefantrine or other ACTs are not recommended for children below 4 months of age or 5 kg body weight. Such children should be treated with quinine (MOH Uganda; 2010).

Effective case management of malaria illness and anemia: Iron supplementation for the prevention and treatment of anemia should be given to pregnant mothers as part of routine antenatal care. Pregnant mothers should also be screened for anemia, and those with anemia should be managed according to national reproductive health guidelines (WHO; 2004).

2.11 Malaria Preventions

Intermittent preventive treatment: To all pregnant mothers in areas, WHO recommends a schedule of four antenatal clinic visits, with three visits after quickening. Intermittent preventive treatment of sulfadoxine–pyrimethamine, because it is safe for use during pregnancy, effective in mothers of reproductive age and can be delivered as a single dose under observation by a health worker (WHO; 2004).

Insecticide-treated nets: Insecticide-treated nets should be provided as early in pregnancy as possible to all pregnant mothers. Their use should be encouraged for mothers throughout pregnancy and postpartum.

Other malaria preventive measures: Use a mosquito repellent on your skin – choose one specifically recommended for use in pregnancy and apply it often, following the manufacturer's instructions.

CHAPTER THREE

METHODOLOGY OF THE STUDY

3.1 Study Area

The study was conducted at Arua regional referral hospital West Nile region of Uganda.

3.2 Study Population

The study was conducted among pregnant mothers admitted to maternity ward in Arua regional referral Hospital.

3.3 Study Design

A descriptive cross-sectional study was used in which the prevalence of malaria among pregnant mothers admitted to maternity ward regional referral hospital maternity ward.

3.4 Sample Size Determination

The sample size was determined using the Fisher's formula, which is shown below;

$$S = \frac{Z^2 pq}{d^2}$$

Where;

S = Sample size.

Z = standard deviation at the required degree of accuracy which at 95% is 1.96.

P = proportion of pregnant mothers with malaria (57%)

P = 0.57

q = 1-p (Percentage of pregnant mothers without malaria)

q=1-0.57

q=0.43

d= the degree of error the researcher will be able to accept

$$d=0.09$$

Therefore;

$$S = \frac{(1.96)^2 \times 0.43 \times 0.57}{(0.09)^2}$$

$$S=116 \quad (\text{Brabin; 1983}).$$

Due to limitation in time and finance the researcher used only a sample size of 70 pregnant mothers with malaria.

3.5 Sampling Method

All pregnant mothers admitted to maternity ward Arua regional referral hospital were considered to represent the entire population under study. The participants were randomly selected and recruited in this study, and determined the variables - Demographic characteristics of the pregnant mothers, factors and prevalence of malaria in pregnancy after obtaining informed consent of the mothers.

3.6 Inclusion and Exclusion Criteria

3.6.1 Inclusion

All pregnant mothers admitted for malaria in Arua regional referral hospital maternity ward who were able to respond and consented fully were chosen to participate.

3.6.2 Exclusion

Any pregnant mother in the maternity ward who were unable to consent and respond were not included in the study

3.7 Ethical Consideration

Confidentiality of information obtained from the study participants were observed while there were restrictions to data access only to people directly involved in the study.

Respondents were informed on possible study risks and the benefits. Informed consent was sort from study participants who were asked to sign an informed consent form.

Individual results of this study were relayed back to individuals through the clinician.

The clearance to conduct study was sort from the DHO and Arua referral Hospital

3.8 Data Collection Methods

Questioners and previous records were used to collect the data. Data base was created and during the time of data collection, the questioners were administered to the respondents

3.9 Data Analysis

The data collected was entered were entered in Statistical Package for Social Science (SPSS) and analyzed as follows:

- Univariate analysis was ran to describe data in terms of absolute numbers, frequency , percentages, Graphs, and mean.
- Bivariate analysis and multivariate was ran for independent variables against the outcome

3.10 Data Quality Control

The following procedures were observed to ensure quality of results, ultimately data generated from this study:

- Standard operating procedures that were developed by ministry of health

3.11 Data Presentation

Findings from this study were shared with Arua regional referral hospital, the DHO and the university.

3.12 Study Limitations

Some participants were scared of giving some information during data collection; however, with good communication skill employed, this was reduced. Duo to financial and time constraints, bigger sample size was not able to be obtained.

CHAPTER FOUR

STUDY FINDINGS

The data analyzed were presented in form of numbers and percentages, tabulations, pie charts and histograms.

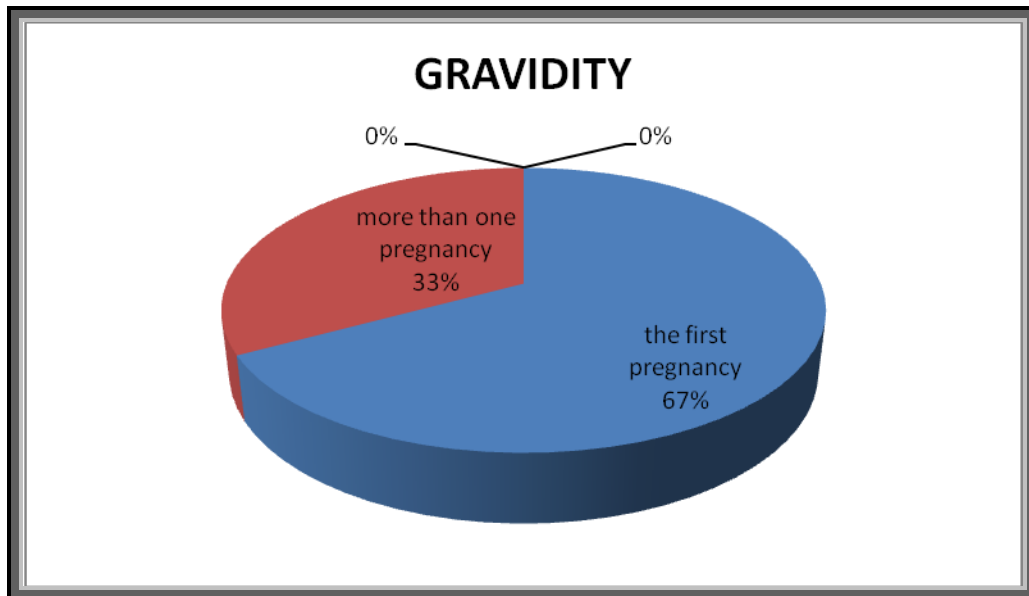
4.1. Demographic and socio- economic characteristics of the respondents

Table.1: Distribution of demographic and socio-economic characteristics of respondents.

Characteristic	S=70	%
Age		
<20	16	22.9
20-30	39	55.7
30+	15	21.4
Total	70	100
Marital status		
Single	29	41.4
Married	41	58.6
Divorced	0	0.0
Others	0	0.0
Total		100
Education level		
Primary	49	70.0
Secondary	8	11.4
Tertiary/Institution	0	0.0
None	13	18.6
Total	70	100
Religion		
Christian	41	58.6
Muslim	29	41.4
None	0	0.0
Total	70	100
Occupation		
Civil servant	11	15.7
Business	9	12.9
Peasant farmer	40	57.1
Others	10	14.3
Total	70	100

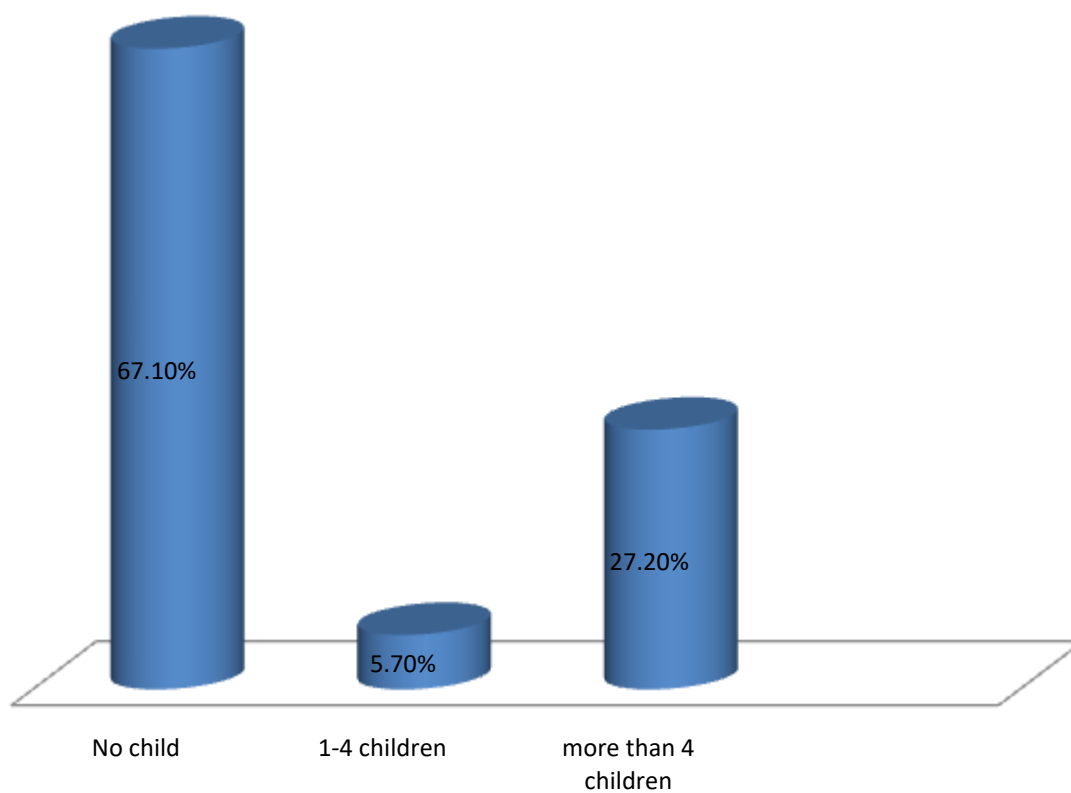
4.2 Factors that contribute to high prevalence of malaria among pregnant mothers from December 2013 to March 2014

4.2.1 Figure 1: Gravidity of the mothers



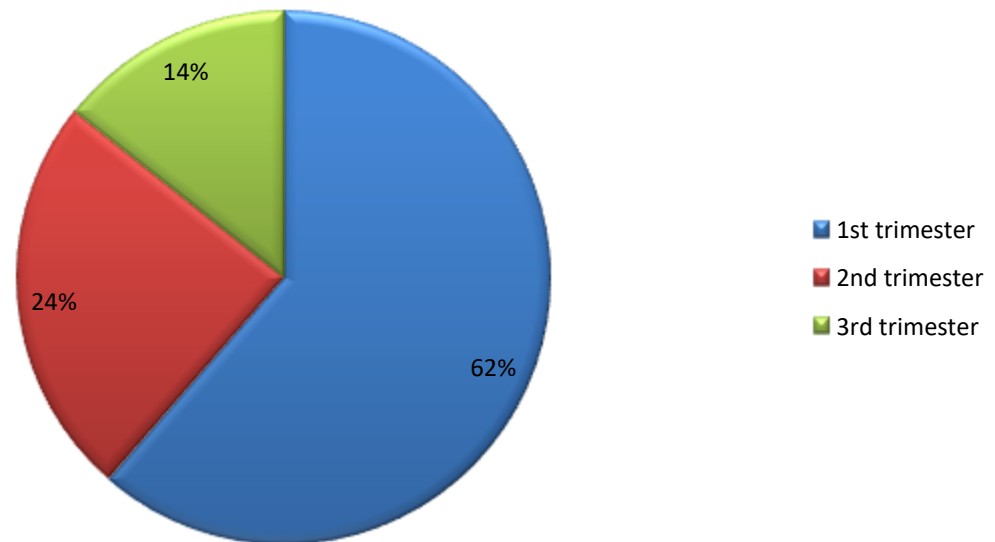
Majority of the patients (67%) had the first pregnancy while 33% had more than one pregnancy.

4.2.2 Figure 2 shows number of mother's children



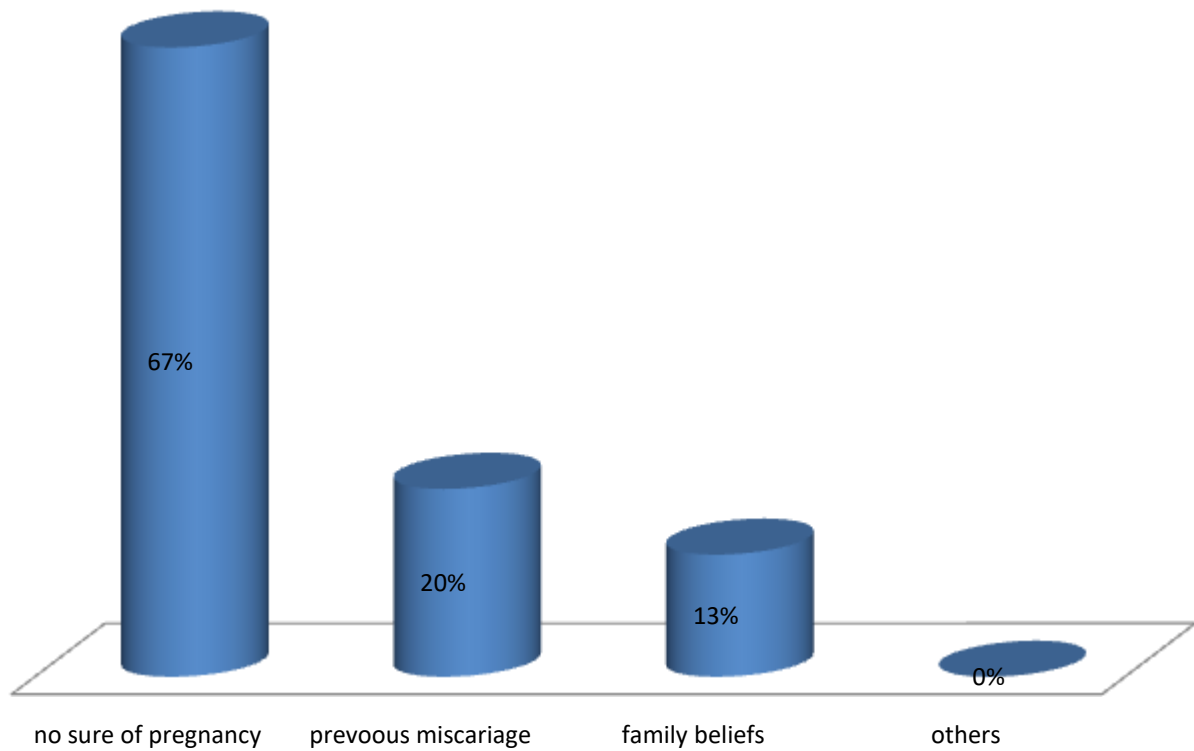
Majority of the mothers (67.1%) had no child while 27.2% and 5.7% had more than 4 **and** 1-4 children respectively.

4.2.3 Figure 3 shows age of gestation (by trimester) at first ANC visit(s=70).



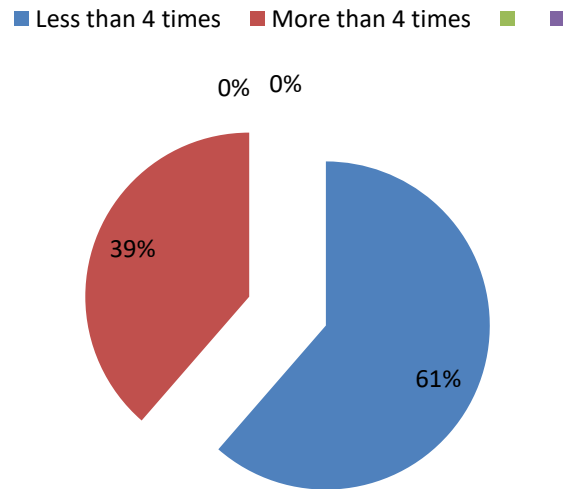
Most mothers (62%) were in the 1st trimester, 24% in the second trimester and 14% in 3rd trimester.

4.2.4 Figure 4 shows reason for late ANC visit (S=70)



Majority of the mothers attended ANC late because they were not sure of the pregnancy while 20% had previous miscarriage and 13% had family beliefs.

4.2.5 figure 5 shows number of ANC visit (S=70).

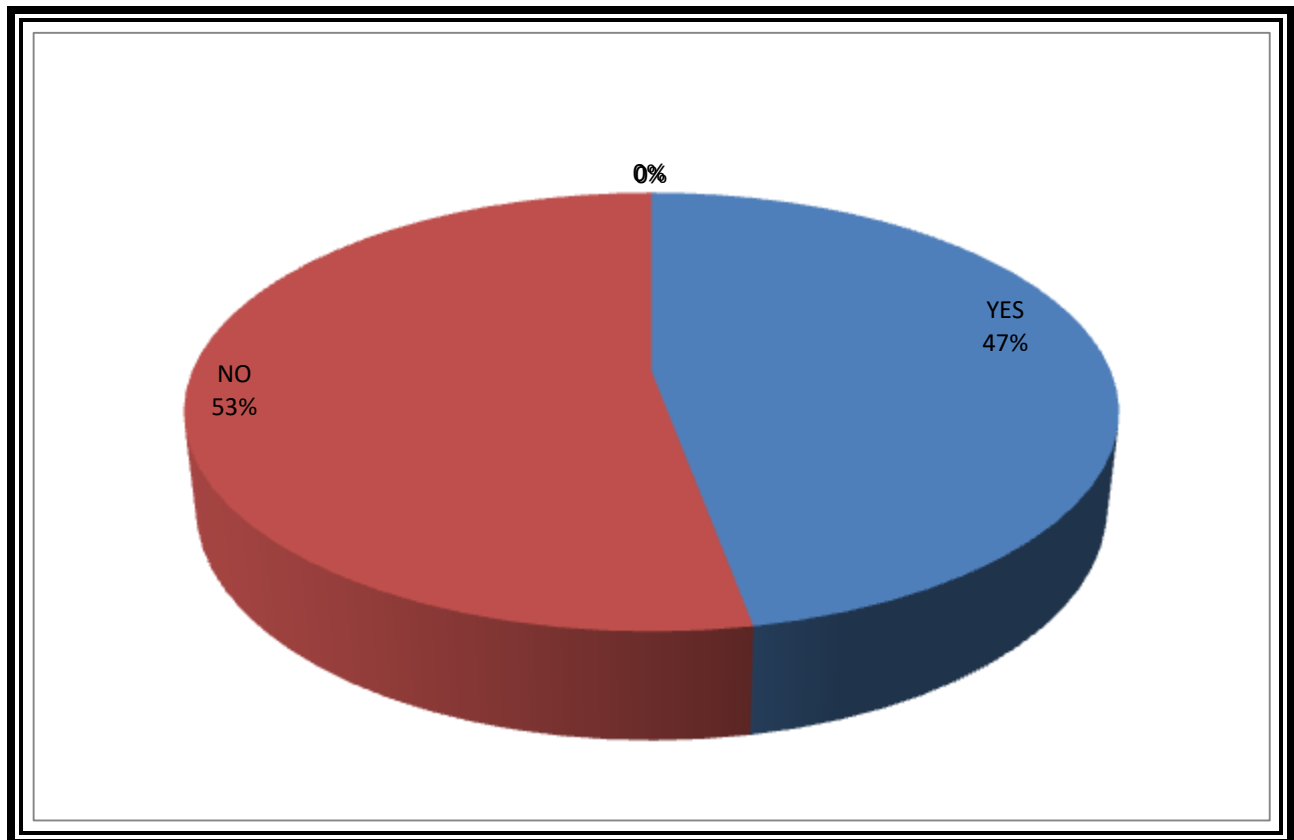


Majority of the mothers (61%) had attended ANC less than four times while only 39% attended more than four times.

4.2.6 Table 2: Diagnosis, number of times and management of malaria

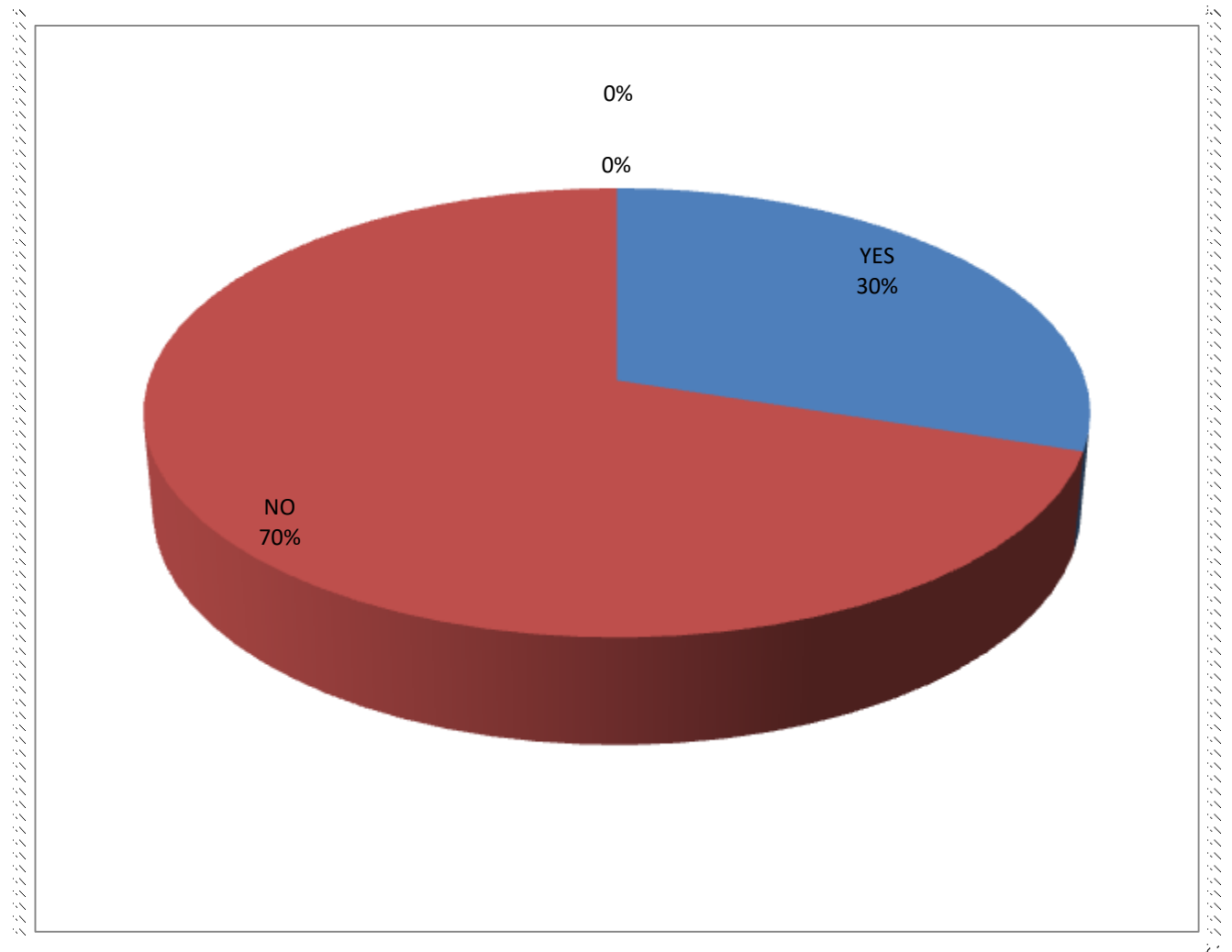
	S=70	%
Diagnosis of malaria		
Yes	47	67.1
No	23	32.9
TOTAL	70	100
Number of times		
Once	8	11.4
Twice	12	17.1
Thrice	33	47.1
Four times	17	24.3
TOTAL	70	100
Management of malaria		
Yes	62	88.6
No	8	11.4
TOTAL	70	100

4.2.7 Figure 6: Sharing of drugs with members of the family (S=70)



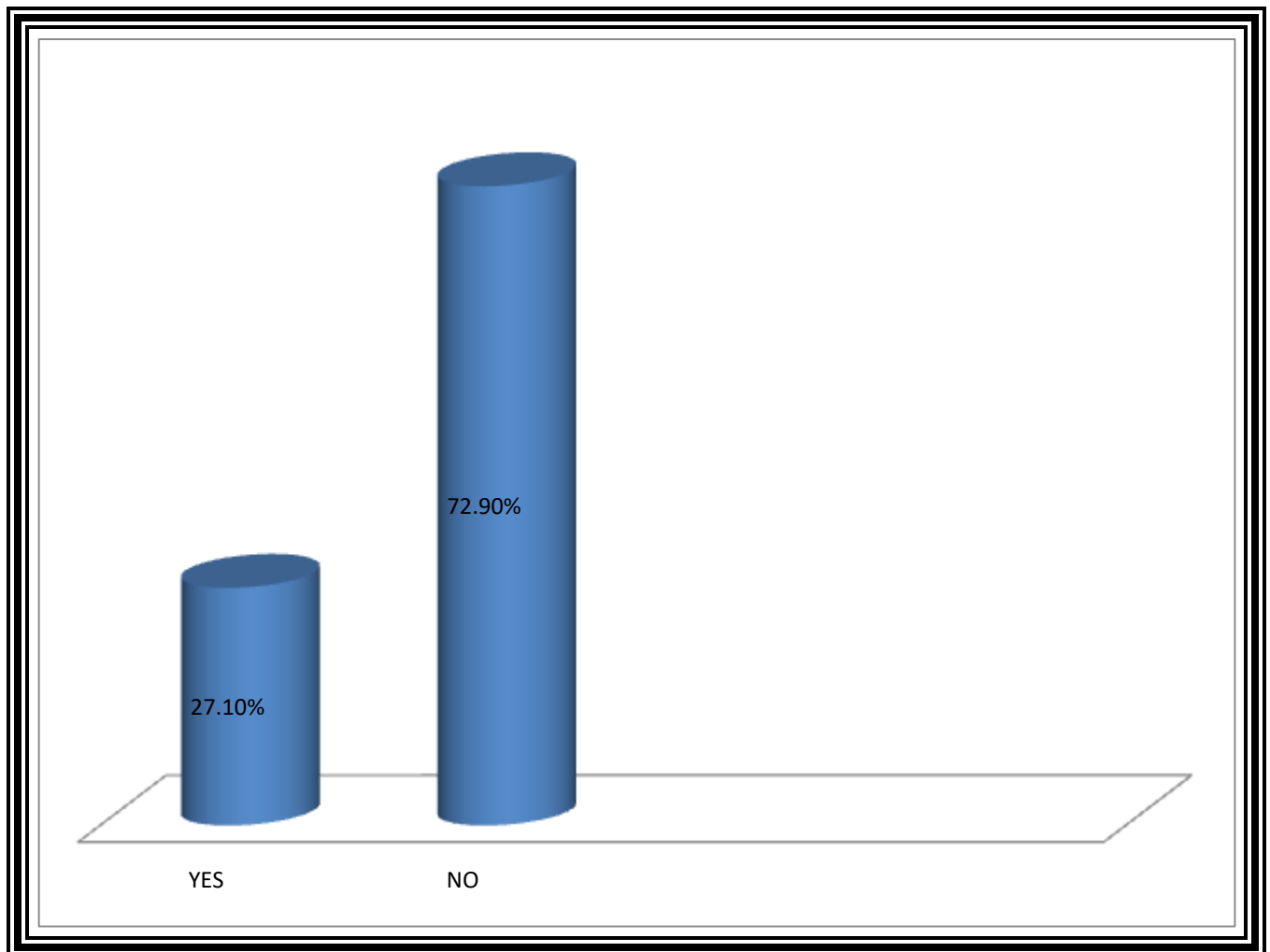
Only 47% of the clients shared medicines with the family members while 53% did not.

4.2.8 Figure 7: Use of ITN (S=70)



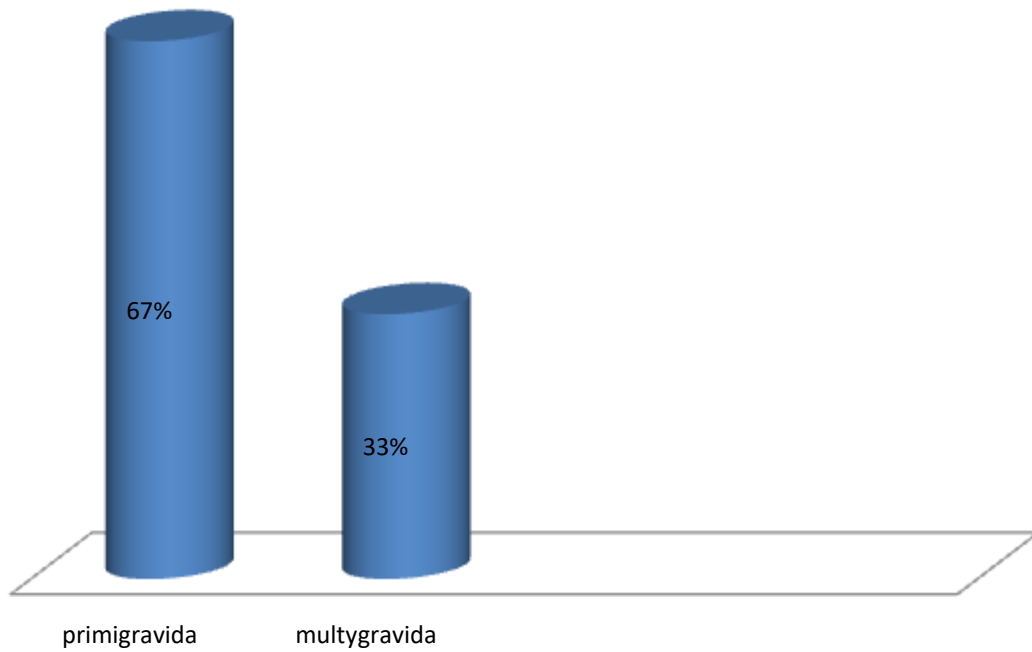
Most mothers 70% did not use treated mosquito nets while only 30% used mosquito nets.

4.2.9 Figure 8: Presence of stagnant water next to mothers' house (S=70)



Just the 27.10% were close to stagnant water as to 72.9% of the mothers.

Figure 9 shows prevalence of malaria in pregnancy



Prevalence of malaria was higher in primigravidas (67%) than multigravidas (33%).

CHAPTER FIVE

DISCUSSION, CONCLUSION AND RECOMMENDATION

DISCUSSION

5.1.1 Demographic and socio- economic characteristics of the respondents

Most of the mothers 39 (55.7%) are of the age between 20-30 years. This conforms to the Uganda Bureau of Statistics report of the most fertile group. Followed by 16(22.9%) who are less than 20 years and then 15 (21.4) greater than 30 years (UBOS, 2007). 29 (41.4%) of the mothers were single and 41 (58.6%) were married/ cohabiting. The mothers population is dominated by 49 (70%) mothers who stopped in primary level of education, which is beyond expectation, because according to UBOS (59.4%) of mothers stopped in primary. which may contributes to ignorance of most mothers on the importance of ANC, 8 (11.4%) of the mothers were in secondary education, 13 (18.6%) of the mothers who never went to school (UBOS, 2007).

5.1.2 Factors that contribute to high prevalence of malaria among pregnant mothers.

The gravidity of the mothers

Malaria in pregnancy is usually associated with gravidity. From the results it indicates that, the majority 47 (67%) of the pregnant mothers were in their first pregnancy, this is because in high transmission areas, primigravidae experience the most severe episodes (Duffy and Fried, 2005). 23 (33%) were in more than one pregnancy, which is in line with findings of Brabin B in 1983 where he found that 139 (64%) of them were primigravidae and 38 (40%) in their second pregnancy, this was due to lower immunity in pregnancy (Brabin, 1983).

High level of poverty and illiteracy: Leading to poor sanitation, undernourishment making them vulnerable to malarial infection.

Poor health facilities: Control and preventive measures not sufficient in the community

Frequency of attending ANC

Majority of the mothers 43 (61%) attended 4 or more than 4 ANC and only 27 (39%) attended less than 4 ANC. The majority said this is due to long distance that they have to walk to the hospital, and yet they have no money for transport.

Majority of the mothers 47 (67.1%) have ever been diagnosed of malaria and only 23 (22.9%) have not been diagnosed of malaria during their current pregnancy. Most of them 33 (47.1%) were diagnosed thrice with malaria, 17 (24.3%) four times, 12 (17.1) twice and 8(11.4) were diagnosed once.

Sharing of drugs

Of the women interviewed, 33 (47%) were found to be sharing their drugs with some family members, however, 37 (53%) do not share their drugs.

Sleeping under mosquito net

49 (70%) of the mothers interviewed do not sleep under mosquito net. Only 21 (30%) sleep under ITN

Prevalence of malaria in pregnancy

A total of 116 pregnant mothers were admitted to maternity ward Regional Referral Hospital within this period of the study. 70 of them were diagnosed of malaria; the prevalence of malaria is 52%, 47 (67%) were primigravidae and 23 (33%) were multigravida. This is in line with findings of Brabin B in 1983 where he found that 139 (64%) of them were primigravidae and 38 (40%) in their second pregnancy (Brabin, 1983). This is because in high transmission areas, primigravidae experience the most severe episodes (Steketee et. al, 1996)

5.2 Conclusion

Malaria prevalence among pregnant mother is high. Up to 52%, Primegravida are the most susceptible to malaria, poverty, illiteracy, malnutrition, inadequate health facilities and lack of health education are among other factors contributing to the high prevalence of malaria among pregnant mothers.

5.3 Recommendations

There is need to scale up malaria control and prevention programs.

Scholarship packages should be given to girls to encourage female education, especially the brilliant needy ones.

Training of more health workers for Uganda.

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APPENDICE I

Questionnaires for pregnant mothers with malaria admitted to maternity ward regional referral hospital maternity ward

My name is **JURUA NORMAN** and I would like to find out the **PREVALENCE OF MALARIA IN PREGNANT MOTHERS ADMITTED TO MATERNITY WARD REGIONAL REFERRAL HOSPITAL MATERNITY WARD**. Your participation is voluntary and the information you give is very confidential and important.

I hope that this information will be used to reduce and prevent the prevalence and factors that contribute to high prevalence of malaria in pregnant mothers who are admitted in maternity ward of Arua regional referral hospital.

NB: Tick the correct answer and write where necessary.

Section A: Demographic Data

1. Age (years) of the respondent.....

[1] 15-20 ☐ [2] 20-30 ☐ [3] 30+ ☐

2. Marital status?

[1] Single ☐ [2] married ☐

[3] Divorced ☐ [4] others (specify).....

3. Educational level?

[1] Primary ☐ [2] Secondary ☐

[3] Tertiary ☐ [4] None ☐

4. Religious affiliation

[1] Christian ☐ [2] Muslim ☐

[3] None ☐ [4] others (specify).....

5. Occupation

[1] Civil servant ☐ [2] Business ☐
[3] Peasant farmer ☐ [4] others (specify).....

**SECTIONB: FACTORS THAT CONTRIBUTE TO HIGHPREVALENCE OF
MALARIA IN PREGNANCY**

1. Is this your first pregnancy?

[1] Yes ☐ [2] No ☐

2. How many children do you have?

[1] No child ☐ [2] 1-4 children ☐
[3] 5-6children ☐ [4] 7-9children ☐

3. At what gestational age did you start the antenatal clinic visits?

[1] 1-3months ☐ [2] 4-6months ☐ [3] 7-9months ☐

4. Why did you start at that stage?

[1] Not sure of pregnancy ☐ [2] previous experience of miscarriage ☐
[3] Family beliefs ☐ [4] others (specify).....

5. How many times do you attend ANC during pregnancy?

If less than 4times why?

.....

6. Have you ever been diagnosed with malaria during pregnancy?

1] Yes ☐ [2] No ☐

If yes how many times?

Once ☐ Twice ☐

Thrice ☐ four times ☐

Was it managed?

1] Yes ☐ [2] No ☐

7. Do you share your drugs with some of your family members?

1] Yes ☐ [2] No ☐

8. Do you sleep under an insecticide treated mosquito net?

[1] Yes ☐ [2] No ☐

9. Are there any cultural practices that inhibit the intake of malaria prophylaxis in pregnancy?

[1] Yes ☐ [2] No ☐

If yes, why?

10. Is there any stagnant water next to your house?

Yes ☐ No ☐

THANK YOU FOR YOUR COOPERATION AND MAY GOD BLESS YOU ALL.

APPENDIX II: Time Frame

APPENDICE III: MAP OF UGANDA

OBJECTIVES	ACTIVITIES	TIME FRAME				
		DEC 2013	JAN 2014	FEB 2014	MAR 2014	PERSON RESPONSI BLE
ADMINISTRATIVE REQUIREMENTS	Choosing and presentation of the research topic for approval	@ @ @				Supervisor Researcher
PROPOSAL WRITING	Proposal writing, typing, printing and binding. Handing in of proposal to the supervisor Research proposal approval		@ @ @ @ @ @ @ @ @ @ @ @			Supervisor Researcher
GATHERING DATA	Distribution of research tools and collection Of data			@ @ @		Researcher
DATA ANALYSIS	Analyzing collected information, compiling the analyzed information Discussing, Conclusion			@ @ @ @	@ @ @ @	Researcher

APPENDIX III: MAP OF UGANDA



(UBOS; 2007)

APPENDIX IV: INTRODUCTION LETTER



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OFFICE OF THE DEAN, FACULTY CLINICAL MEDICINE & DENTISTRY

28/01/2014

TO WHOM IT MAY CONCERN

RE: JURUA NORMAN (BMS/0086/82/DU)

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

He wishes to conduct his research project in your hospital.

Any assistance given will be appreciated.

Thank you



Dr. Akib Surat
Asso. Dean, FCM & D

"Exploring the Heights"