

**PREVALENCE OF MALARIA AND ASSOCIATED CONTROL METHODS
AMONG PREGNANT MOTHERS ATTENDING FOCUSED
ANTENATAL CARE AT IGANGA MAIN HOSPITAL,
IGANGA DISTRICT, EASTERN UGANDA**

**MUGOYA MWESIGWA PHILLIP
DCM/0008/143/DU**

**A RESEARCH REPORT SUBMITTED TO THE SCHOOL OF ALLIED HEALTH
SCIENCES IN PARTIAL FULFILLMENT OF THE REQUIREMENTS FOR THE
AWARD OF A DIPLOMA IN CLINICAL MEDICINE AND COMMUNITY
HEALTH OF KAMPALA INTERNATIONAL
UNIVERSITY, UGANDA**

JULY, 2017

DECLARATION

I, Mugoya Mwesigwa Phillip, DCM/0008/143/DU, hereby declare that this research report is my own work and has never been presented to any institution for any academic award.

Signature.....

Date.....

APPROVAL

This is to certify that this report has been done under the guidance and supervision of;

Dr. Kalange Muhamudu

Signature.....

Department of physiology

Date.....

Faculty of Biomedical sciences

Kampala International University

Uganda

ACKNOWLEDGEMENTS

First and foremost thanks to God, for bestowing I divine health for the whole period of my pursuance of this study.

Also, I express my profound and sincere gratitude to my supervisor, Dr.Kalange Muhamudu who patiently led me during my research and writing this dissertation, with constructive comments.

I deeply thank all lectures and all other staff members in the Department of Allied Health Sciences for their great efforts and friendly relationship during my study journey at Kampala International University western campus. I learned and gained a lot of knowledge from your experiences, thanks so much.

I also acknowledge and thank the medical superintendent Iganga general hospital District for giving me permission to collect data the hospital.

Special thanks go to Dr. Isa for his constructive guidance and support during fieldwork.

My great thanks go to my classmates of DCM/143 series programme. Special thanks go to the pregnant women for their willingness to participate in the survey.

DEDICATION

I would like to dedicate this work to my parents Bp. Mugoya Paul and Mrs. Justine Mugoya for always being my pillar of support throughout my academic journey. The dissertation is also dedicated to my sister Dorcus and my little brother Rich who have been my source of inspiration, thanks for being a blessing to my life. It is also dedicated to my friend and roommate Ronald and colleague Yasin thanks for your guidance and to all pregnant women who voluntarily participated in the study at the antenatal care clinic, Iganga main Hospital.

Table of Contents

DECLARATION.....	i
APPROVAL.....	ii
ACKNOWLEDGEMENTS	iii
DEDICATION	iv
LIST OF ABBREVIATIONS	vii
ABSTRACT	ix
CHAPTER ONE.....	1
INTRODUCTION	1
1.1 Background.....	1
1.2 Problem Statements.....	2
1.3 Objective of the study	3
1.3.1 Main objective	3
1.3.2 Specific objectives.....	3
1.4 Research Questions	3
1.5 Justification of the study	3
1.6 Scope of the study.....	3
1.6.1 Time scope.....	3
1.6.2 Content scope	3
1.6.3 Geographical scope	3
1.7 Conceptual framework	4
CHAPTER TWO.....	5
LITERATURE REVIEW	5
2.1 Definition.....	5
2.2 Epidemiology of malaria	5
2.3 Prevalence of malaria	5
2.4 Immunity and malaria	6
2.5 Effect of Malaria on pregnant woman and unborn baby.....	6
2.6 Utilization of ANC services	7
2.7 Malaria control methods.....	7
CHAPTER THREE	8
METHODOLOGY	9
3.1 Study design	9

3.2	Study area	9
3.3	Study population	9
3.4	Sample size	9
3.5	Sampling method	10
3.6	Study inclusion and exclusion criteria	10
3.6.1	Inclusion criteria.	10
3.6.2	Exclusion criteria	10
3.7	Data collection method.....	10
3.8	Data quality control.....	10
3.9	Data analysis.....	10
3.10	Data presentation	10
3.11	Limitations.....	10
3.12	Ethical Consideration	11
	CHAPTER FOUR	11
	RESULTS	12
4.1	Socio demographic characteristics of participants	12
4.2.1:	Prevalence of malaria among pregnant mothers	13
4.2.2:	Methods used by the pregnant mothers to control malaria.....	13
	CHAPTER FIVE.....	15
	DISCUSSION, CONCLUSIONS AND RECOMMENDATION	15
5.1	Discussion.....	15
5.1.1	Prevalence of malaria among participant pregnant women	15
5.1.2	Malaria control methods used by participant pregnant women.....	15
5.2	Conclusion.....	16
5.3	Recommendation	16
	REFERENCES.....	17
	APPENDICES.....	Error! Bookmark not defined.
	APPENDIX I: CONSENT FORM.....	19
	APPENDIX II: QUESTIONNAIRE.....	19
	APPENDIX III: MAP OF IGANGA DISTRICT SHOWING IGANGA MUNICIPAL CCOUNCIL WHERE IGANGA HOSPITAL IS LOCATED.....	22

List of tables

Table 1 Respondents social demographic data.	12
Table 2 prevalence of malaria among pregnant women	13
Table 3 methods used by pregnant mothers to control malaria	14

LIST OF ABBREVIATIONS

ACTs	Artemisinin combined Treatment
AIDS	Acquired Immune Deficiency Syndrome
ANC	Antenatal clinic
HIV	Human Immune Virus
IPTpSP	Intermittent Presumptive Treatment in Pregnancy with sulfadoxine- Pyrimethamine
ITNs	Insecticide treated nets
KIUTH	Kampala International University Teaching Hospital
NMCP	National Malaria control programme
PAM	Pregnancy Associated Malaria
PMI	President's Malaria Initiative
RDTs	Rapid Diagnostic Test
UMIS	Uganda Malaria Indicator Survey
WHO	World Health Organization

ABSTRACT

Background: Malaria is a protozoal disease caused by Plasmodium spp parasite transmitted by an infected female mosquito as it bites the human host. It is one of the most common causes of infectious disease related deaths in the World with Africa bearing the largest proportion of the world's malaria burden because the region hosts the anopheles mosquito which is the most efficient malaria vectors, and also due to lack of the basic infrastructure and resources necessary for efficient and sustainable control of the malaria disease.

Despite the wide control strategies, occurrence of malaria is on the increase with an estimated incidence rate of 37% globally and 42% in Africa. In Uganda, malaria is the leading cause of morbidity and mortality and is responsible for 40% of all outpatient visits, 25% of all hospital admission and 14% of all hospital deaths. In eastern Uganda the prevalence of malaria is 37% and this poses a health risk to the pregnant women and their unborn.

Objective: To determine the prevalence of malaria and associated control methods among pregnant women attending focused antenatal care at Iganga Main Hospital, Iganga District.

Methods: A descriptive cross sectional study was conducted in June 2017 at Antenatal Care Clinic, Iganga Main Hospital, and Iganga District, Uganda. Quantitative data was collected by means of questionnaires covering a study population of 126 pregnant mothers where a systematic random sampling method was used.

Results : 52/126 (41.3%) were found positive to malaria parasites and majority of pregnant women were aged 20-30 years, these had highest infection rate of 44.2% (38/86), with primigravidas having the highest infection rate of 54.8%.

It was also observed that according to gestational age of pregnancy, women of first trimester had the highest prevalence of 68.3% (28/41). The study showed that the most common barrier method used to prevent malaria was treated mosquito nets with 76/126 (60.3%).

Conclusion and Recommendation: In general, pregnant mothers had fair knowledge about malaria control methods. Despite focused antenatal care and the awareness on malaria control methods, a malaria prevalence of 41.3% was scored. Therefore interventions aimed at social and behaviour change are necessary to address the gaps highlighted by the study.

CHAPTER ONE

INTRODUCTION

1.1 Background

Malaria is a protozoal disease caused by *Plasmodium* spp parasites. It is transmitted by an infected female mosquito as it bites the human host (WHO, 2010). The protozoa that cause malaria worldwide include *Plasmodium falciparum*, *Plasmodium malariae*, *Plasmodium ovale* and *Plasmodium vivax*. However, *Plasmodium falciparum* causes the most febrile disease (WHO, 2010).

Malaria caused by *Plasmodium falciparum* is a febrile disease mostly affecting Sub Saharan Africa (Steketee, R. W., Nahlen, B. L., Parise, M. E., and Menendez, 2001). Malaria is endemic in tropical Africa due to presence of anopheles mosquitoes which are the vectors (WHO, 2003). It is one of the most common causes of infectious disease related deaths in the World (WHO, 2003). It is a major health problem in developing countries causing considerable morbidity and mortality especially in Sub Saharan Africa (Steketee, R. W., Nahlen, B. L., Parise, M. E., and Menendez, 2001).

Africa bears the largest proportion of the world's malaria burden (WHO, 2012). This is due to *Plasmodium falciparum* which causes the most difficult to treat and severe form of malaria, the region hosts the anopheles mosquito which is the most efficient malaria vectors, and also due to lack of the basic infrastructure and resources necessary for efficient and sustainable control of the malaria disease (WHO, 2012).

There is an increasing risk of the disease in pregnant mothers and the infants than other human categories (Government, 2011). Children under five years and pregnant women are at risk because of low immunity against the disease. In endemic areas, the frequency and severity of malaria increases with pregnancy (Gilles, 2008). Uganda ranks third in malaria burden in Africa in which 95% of the countries are malaria endemic (WHO, 2012).

Therefore malaria is one of the most important diseases in Uganda, causing significant morbidity, mortality and negative socio- economic impact. Malaria is responsible for 30-50% of outpatient visits and 35% of admissions (Government, 2008).

Pregnancy exacerbates malaria through a non specific activity of immune system, the protective antiplasmodial activity is suppressed at pregnancy and this has a clinical

consequence (Steketee, R. W., Nahlen, B. L., Parise, M. E., and Menendez, 2001). Women therefore become more susceptible to malaria upon during pregnancy.

Pregnant women in malaria endemic areas don't always receive the necessary prevention and treatment they need, this contributes to an increased number of maternal and infant death caused by malaria (Schellenberg, 1999). Studies have shown that 40% of pregnant women come to antenatal clinics in 2nd trimester of their pregnancy missing out on the ITNs, which are part of the preventive package delivered during first trimester ANC visit that would provide additional protection as well as protection for the newborns.

Despite a number of studies conducted over last decades, additional evidence is still required to understand how best to control malaria. Innovative approaches to malaria control targeting high-risk populations are urgently needed to achieve these goals. For formulation of strategies to control malaria in pregnant women, it is a prerequisite to determine the extent of the disease among the pregnant mothers. It is on this basis that studies should be carried to establish the level of malaria burden in this high risk population.

1.2 Problem Statements.

Malaria caused by *P.falciparum* is a great health burden in sub-Saharan Africa where it is endemic (WHO, 2013). In pregnancy, malaria is an obstetric, social and medical problem that requires multidisciplinary control strategies (WHO, 2013). It is one of the major causes of maternal morbidity, mortality and infant mortality globally (WHO, 2008). Despite the wide control strategies, occurrence of malaria is on the increase with an estimated incidence rate of 37% globally and 42% in Africa (WHO, 2015).

In Uganda, malaria is the leading cause of morbidity and mortality and is responsible for 40% of all outpatient visits, 25% of all hospital admission and 14% of all hospital deaths (Baueret, 2015). In eastern Uganda the prevalence of malaria is 37% and this poses a health risk to the pregnant women and their unborn with varying health consequences (UDHS, 2015). This calls for strategies aimed at controlling the malaria disease in this vulnerable population.

The study is aimed at determining the prevalence of malaria among pregnant women attending ANC at Iganga Main Hospital. This knowledge will guide stakeholders in about the malaria burden in pregnant women and formulate appropriate measures for its control.

1.3 Objective of the study

1.3.1 Main objective

To determine the prevalence of malaria and associated control methods among pregnant women attending focused antenatal care at Iganga Main Hospital, Iganga District.

1.3.2 Specific objectives

1.3.2.1 To determine the prevalence of malaria among pregnant women attending focused antenatal care at Iganga Main Hospital, Iganga District.

1.3.2.2 To identify the Malaria control methods used by pregnant women attending focused antenatal care at Iganga Main Hospital, Iganga District.

1.4 Research Questions

What is the prevalence of malaria among pregnant women attending focused antenatal care at Iganga main hospital?

What are the malaria control methods used by the pregnant women attending focused antenatal care in Iganga?

1.5 Justification of the study

The study was to generate knowledge about the prevalence of malaria among pregnant women and the associated factors. This knowledge will guide stakeholders in formulation of appropriate strategies to control and manage malaria in pregnant women.

1.6 Scope of the study

1.6.1 Time scope

The study was conducted for two months of May 2017

1.6.2 Content scope

The study was concentrated on determining the prevalence of malaria and the associated factors among pregnant mothers attending focused antenatal care.

1.6.3 Geographical scope

The study was conducted at Antenatal Care Clinic, Iganga Main Hospital, Iganga District.

1.7 Conceptual framework

INDEPENDENT VARIABLE

Barrier methods

- Plain mosquito nets
- treated mosquito nets
- clothes to cover all limbs

Environmental methods

- cut grass around homes
- cover pot holes with sand
- stagnant water clearance

Chemical methods

- Repellents
- Burning indigenous leaves
- Pesticides spray

DEPENDENT VARIABLE

Malaria prevalence in pregnancy

CHAPTER TWO

LITERATURE REVIEW

2.1 Definition

Malaria is a protozoal disease caused by *Plasmodium* spp parasites. It is transmitted by an infected female mosquito as it bites its host (WHO, 2010). Worldwide malaria is caused by *Plasmodium falciparum*, *Plasmodium malariae*, *Plasmodium ovale* and *Plasmodium vivax*. *Plasmodium falciparum* is the most predominant in tropical Africa due to presence of anopheles mosquitoes which are the vectors (WHO, 2010).

2.2 Epidemiology of malaria

Malaria has been eradicated Europe and most parts of America following widespread spraying of dichloride phenyltrichloro ethane (DDT) (William, 2013). Sub-Saharan Africa bears the greatest burden of the disease (WHO, 2008) contributing 80% of deaths. Most deaths due to malaria occur in pregnant women and children below 5 years (Malaria consortium, 2008). In Uganda the prevalence of malaria in pregnant women is as high as 62.1% (Ndyomugenyi R, 2009). In Eastern Uganda the malaria prevalence is at 37% (UDHS, 2015). The *Anopheles* mosquito carries the malaria parasites, which are released in blood vessels after human beings are bitten. The parasites later multiply and cause parasitaemia that develop into the malaria disease (UDHS, 2015).

2.3 Prevalence of malaria

Malaria occurrence is on the increase with an estimated incidence rate of 37% globally and 42% in Africa (WHO, 2015). Malaria in pregnancy is a significant health problem in sub-Saharan Africa where 90% of the global malaria burden occurs. Malaria disease is more hazardous especially an infection with *P. falciparum* during pregnancy. *P. falciparum* malaria can run a turbulent and dramatic course in pregnant women. Pregnancy appears to interfere with the immune processes in malaria, a disease which itself alters immune reactivity (Stella, 2012). In pregnancy, malaria tends to be more atypical in presentation. This could be due to the hormonal, immunological and haematological changes during pregnancy (Plebanski, 2000). In highly endemic malarious area such as Nigeria, where semi-immune adults usually have substantially acquired resistance to local strains of *Plasmodia*, the prevalence of clinical

malaria is higher and its severity greater in pregnant women than non-pregnant women (Amira, 2009).

In Uganda, malaria is the leading cause of morbidity and mortality and is responsible for 40% of all outpatient visits, 25% of all hospital admission and 14% of all hospital deaths (Baueret, 2015). In eastern Uganda the prevalence of malaria is 37% and this poses a health risk to the pregnant women and their unborn with varying health consequences (UDHS, 2015)

2.4 Immunity and malaria

In areas where malaria is highly endemic, a protective semi-immunity against *Plasmodium falciparum* is acquired during the first 10–15 years of life, and the majority of malaria related morbidity and mortality happens in young children (WHO, 2010). However, in contrast with low malaria prevalence in adults, pregnant women in endemic areas are highly susceptible to malaria, and both the frequency and the severity of disease are higher in pregnant than non-pregnant women (Otel, 2009). In pregnancy, there is a transient depression of cell-mediated immunity that allows fatal allograft retention but also interferes with resistance to various infectious diseases (Richards, 2011). Cellular immune responses to *Plasmodium falciparum* antigens are depressed in pregnant women in comparison with non-pregnant control women (Okeke, 2009). Anti-adhesion antibodies against chondroitin sulphate A-binding parasites are associated with protection from maternal malaria, but these antibodies develop only over successive pregnancies, accounting for the susceptibility of prim graviders to infection (Jones, 2010). Indeed, women in first and second pregnancies are the most affected, with both gravidity and premunition influencing susceptibility to malaria infection (Okoth, 2013). As with peripheral parasitaemia, placental infection is also most frequent and heaviest in primigravidae (Walker et al., 2007). Also in areas of high transmission, primigravidae are more susceptible to infection than multiparous women (Okoko *et al*, 2008). Furthermore it has been observed that increased risk of malaria varies during the course of pregnancy with the first trimester showing highest prevalence (Mendez, et al 2009).

2.5 Effect of Malaria on pregnant woman and unborn baby

Infection with *Plasmodium falciparum* malaria parasites during pregnancy results in a wide range of adverse consequences for the pregnant woman, the developing foetus and the new born. It increases the risk of placental anaemia, spontaneous abortion, maternal anaemia, morbidity, cerebral malaria and febrile malaria. Low birth weight, stillbirth, congenital infection, prematurity, intrauterine growth retardation and foetal anaemia are found to be

associated with the foetus. In areas with stable malaria infection transmission, where malaria prevalence during pregnancy ranges from 10% to 65%, malaria during pregnancy contributes to approximately 2% to 15% of maternal anaemia and 8% to 14% of LBW (Steketee, R. W., Nahlen, B. L., Parise, M. E., and Menendez, 2001).

2.6 Utilization of ANC services

Antenatal care (ANC) is the healthcare and education given during pregnancy. It is sought early in the pregnancy and continued through to delivery. Utilization of ANC services is vital if there is to be a reduction in maternal morbidity and mortality (Hotz TH et al., 2004). The following are the ideal antenatal services provided for pregnant mother: Education activities aimed at developing orientation package, producing complete curriculum and training package; conducting workshops and trainings, measuring the size of the belly by tape measure, palpation – examining the belly with hands or fingertips (the ultrasound system is used in some hospitals), checking the blood pressure, blood group and genotype, hemoglobin test to determine percentage of blood in the body, urine test to detect the level of blood sugar and protein, administration of iron tablets and folic acids. Screening for Sexual Transmitted Infections (STIs), Tuberculosis (TB) and Human Immunodeficiency Virus/Acquired Immune Deficiency Syndrome (HIV/AIDS), tetanus toxoid vaccination, malaria prophylaxis (IPTp), counseling on the signs of danger in pregnancy, safer sex and contraceptive, Health education on nutrition, body fitness and breast feeding (FHI, 2004). These services help boost the mother's immunity and malaria prophylaxis in particular helps prevent malaria in pregnancy.

2.7 Malaria control methods

Vector control is the main way to reduce malaria transmission at the community level. It is the only intervention that can reduce malaria transmission from very high levels to close to zero. For individuals, personal protection (barrier) against mosquito bites represents the first line of defense for malaria prevention (Stella, 2012). Two forms of vector control are effective in a wide range of circumstances: insecticide-treated mosquito nets (ITNs): long-lasting insecticidal nets (LLINs) are the preferred form of ITNs for public health distribution programmes (WHO, 2003). Indoor spraying with residual insecticides: indoor residual spraying (IRS) with insecticides is also a powerful way to rapidly reduce malaria transmission (WHO, 2005; James, 2011). Antimalarial medicines can also be used to prevent malaria (WHO, 2015).

Since mosquitoes are attracted to dark corners, one of the ways to control malaria transmission is through avoiding dark corners. Another chemical method is usage of repellents in closed rooms to repel the mosquitoes (Auerbach et al, 1999).

Killing malaria parasites in the blood before they can cause malaria which is called chemoprophylaxis followed with early diagnosis, timely and adequate of all malaria cases

Another approach to malaria vector control is environmental management aimed at modifying the environment to deprive target vector population of its requirement for survival, this include clearing stagnant water, and cutting long grasses (WHO, 1999)

CHAPTER THREE

METHODOLOGY

3.1 Study design

The study was a descriptive cross sectional study involving collection of quantitative data.

3.2 Study area

The study was conducted at Antenatal Care Clinic, Iganga Main Hospital, Iganga District, Eastern Uganda.

3.3 Study population

The study population involved pregnant women who came for antenatal visit at Iganga Main Hospital during the study period.

3.4 Sample size

The sample size was obtained using Fisher's Formula as below;

$$\frac{n=z^2pq}{d^2}$$

where; n=Desired sample size

Z=Standard deviation at the required degree of accuracy

P=prevalence 9% (WHO 2014)

q=1-P

d=is the proportion of error the researcher is able to accept.

$$\frac{n=1.96^2 \times 0.09 \times 0.91}{0.05^2}$$

n=125.8

n= 126 participants

3.5 Sampling method

Systematic random sampling method was used to select participants.

3.6 Study inclusion and exclusion criteria

3.6.1 Inclusion criteria.

The participants included all pregnant women attending ANC services attending focused antenatal care in Iganga Main Hospital of sound mind and consented to be part of the study to be conducted in May and June, 2017.

3.6.2 Exclusion criteria

All women who were pregnant but refused to consent to the study and those who were mentally ill, deaf or dumb.

3.7 Data collection method

Blood samples was taken from participants, wet smears made and slides processed for microscopy was determined the presence of malaria parasites.

Malaria control methods were obtained through using close ended questionnaire. The results were entered on the same patient's sheet to complete the required data on the sheet.

3.8 Data quality control

To ensure quality control, the blood samples were immediately processed for analysis to determine presence of malaria parasites.

Pre-tested questionnaires were used in data collection about the malaria control practices. Completeness of the questionnaires will be ensured.

3.9 Data analysis

The data collected from the study was manually analysed and tabulated

3.10 Data presentation

Tables were used for data presentation.

3.11 Limitations

The study was carried out on 126 participants who managed to attend antenatal care (ANC) at Iganga Main Hospital. Those who attended ANC at other health facilities and those who

failed to attend were excluded from the study. These mothers could have had an impact on both the prevalence rate and determination of self-care actions on malaria control methods. Therefore results cannot be generalised.

Despite the limitations, the results of the present study elucidate our understanding on the prevalence rates of malaria among pregnant mothers that attended Iganga main hospital antenatal care clinic, Iganga district. The findings of this study could raise concerns of decision makers and assist health authorities in planning interventions and implementation of continuous activities on malaria control programmes in Iganga district.

3.12 Ethical Consideration

The study was carried out after approval of the proposal by the School of Allied Health.

An Introductory Letter from the Administration School of Allied Health Sciences was obtained. Permission was also obtained from the administration of Iganga Main Hospital. Respondents were requested for their consent prior to the study.

Confidentiality was maintained all through the research process and the interviews will be conducted in reasonable privacy.

CHAPTER FOUR

RESULTS

4.1 Socio demographic characteristics of participants

The study involved 126 participant pregnant mothers. The majority (68.3%) were 20-30years old. Most of the participants (88.1%) were married and the majority (32.5%) had attained primary level education. Most participants (46%) were peasants (Table 1).

Table 1 Respondents social demographic data.

Age (years)	Frequency	Percentage (%)
<20	17	13.5
20-30	86	68.3
>30	23	18.2
Marital status		
Single	5	4
Married	111	88.1
Divorced	10	7.9
Educational level		
Primary	41	32.5
Secondary	36	28.6
Tertiary	29	23
None	20	15.9
Occupation		
Civil servant	13	10.3
Business personnel	21	16.7

Peasant	58	46
Others	34	27
Religion		
Protestants	28	22.2
Others	53	42.1
Catholic	24	19.0
Muslims	21	16.7

4.2.1: Prevalence of malaria among pregnant mothers

The results show that out of the 126 participants whose blood samples were examined for infection with malaria parasites, 41.3% tested positive to malaria parasites (*Plasmodium falciparum*). However 58.7% tested negative to malaria parasites (Table 3).

Table 2 prevalence of malaria among pregnant women

Participant's blood sample results	Frequency	Percentage
Infected (malaria parasites present)	52	41.3
Normal (malaria parasites absent)	74	58.7
Total	126	100

4.2.2: Methods used by the pregnant mothers to control malaria

It was observed that the most common barrier method used by the participants to control malaria was treated mosquito nets (60.3%). The least used barrier method was clothes that cover all limbs (6.35%). The most common environmental method used was cutting grass around homes (53.2%). While the least environmental method used was covering pot holes with sand (16.7%). The most common chemical method used was pesticide spray (60.3%) while the least used was burning indigenous leaves (15.9%). (Table 4)

Table 3 methods used by pregnant mothers to control malaria

Variable	Frequency	Percentage %
Barrier Methods Used		
Plain mosquito nets	18	14.3
Treated mosquito nets	76	60.3
Mesh wire on windows	24	19.05
Clothes to cover all limbs	08	6.35
	126	100
Environmental methods		
Cut grass around homes	67	53.2
Cover pot holes with sand	21	16.7
Stagnant water clearance	38	30.1
	126	100
Chemical control methods		
Repellents	30	23.8
Burning indigenous leaves	20	15.9
Pesticides spray	76	60.3
	126	100

CHAPTER FIVE

DISCUSSION, CONCLUSIONS AND RECOMMENDATION

5.1 Discussion

5.1.1 Prevalence of malaria among pregnant women

The current study shows a malaria prevalence of 41.3% among participant pregnant mothers. This is relatively higher than the prevalence (37%) in eastern Uganda (UDHS, 2015), but lower than the national malaria prevalence of 45% (Bauer et al., 2015).

Reports by Aribodor et al., 2009 showed a higher malaria prevalence of 64.4% among pregnant mothers in Nigeria. This was attributed to ineffective use of treated mosquito nets and wrong use of mosquito nets. A study carried out by Medhi et al., (2015), observed a malaria prevalence of 38.1% among pregnant women in Sudan. While Amira, (2009), observed a prevalence of 97.8% among women who contracted malaria. In another study by Amira, (2009), a prevalence of 37% was observed among women admitted to Ed-Duweim Teaching Hospital Khartoum.

The prevalence observed in this study is probably because of the widespread and effective use of treated mosquito nets as observed also in this study.

5.1.2 Malaria control methods used by participant pregnant women

The results of the study show various methods used by the participants in the control of malaria. However, the most commonly used methods include insecticide treated mosquito nets (60.3%), pesticide sprays (60.3%), and grass cutting around the home (53.2%).

In current study the majority of the participants (60.3%) used treated mosquito nets. This is similar to a study on knowledge of and control practices for malaria in southern Sudan, where most participants used mosquito nets in the control of malaria (James, 2011: Gill & Johnson, 1991). This was due to the fact that as pregnant mothers keep on attending antenatal care, they receive free treated mosquito nets.

However, Takken (2002) suggested plain nets as an alternative to the treated nets because of limited negative effects of insecticide use, avoidance of toxic chemicals at household levels and financial saving.

The result of the current study differs from those of Falade et al., (2010), in Nigeria, where only 1.1% of the participants used insecticide treated mosquito nets. This was attributed to the myth of suffocation and irritability by the treated nets.

The current study also shows that clothes that cover all limbs was the minority method used at 6.35% of the participant pregnant mothers. This differs with results of a study by Lillian muchena (2011) where 20% of the respondents in Zimbabwe used that barrier method.

5.2 Conclusion

The finding of the study revealed a malaria prevalence of 41.3% among pregnant mothers.

The most common barrier method used by the participants to control malaria was treated mosquito nets (60.3%). The least used barrier method was clothes that cover all limbs (6.35%). The most common environmental method used was cutting grass around homes (53.2%). While the least environmental method used was covering pot holes with sand (16.7%). The most common chemical method used was pesticide spray (60.3%) while the least used was burning indigenous leaves (15.9%).

5.3 Recommendation

The current prevalence of malaria among pregnant mothers is higher than the regional prevalence (37%) of eastern Uganda this threatens the pregnant mothers in the study area. Therefore there is need for more sensitization of pregnant mothers on malaria prevention and control skills.

The study findings were carried out on a smaller sample size therefore cannot be generalized hence there is need to carry out further studies on this subject on a larger population so as to establish the relationship between prevalence of malaria and the associated control methods.

REFERENCES

- Amira. (2009). Institute of Medicine (U.S.). Committee on the Economics of Antimalarial Drugs (2009).
- Baueret. (2015). “Malaria primer for clinicians in the United States.” *Southern Medical Journal*, . 198 (12): 1197–204; 1205, 1230.
- Gilles. (2008). *Diagnostic methods in malaria. In Bruce- Chwatt’s Essential Malariology, Edition (Gilles H.M, Warrell D.A. eds), Edward Arnold. (3rd ed.)*.
- Government, U. (2008). Malaria Indicator Survery. Kampala: *Ministry of Health*.
- Government, U. (2011). Uganda Malaria Programme Review Report MPR 2001-2010. Kampala: *Ministry of Health*.
- Ndyomugyenyi R, M. P. (2009). Malaria morbidity, mortality and pregnancy outcome in areas with different levels of malaria transmission in Uganda;; *A Hospital Record-Based Study. Trans R Soc Trop Med Hyg. Sep-Oct 2011, 95(5):463-468*.
- Otel. (2009). President’s Malaria Initiative. *Rapid Assessment Report - Uganda*,.
- Plebanski. (2000). “Working without a blindfold: The critical role of diagnostics in malaria control”. *Malaria Journal*1 (Suppl 1): S5.
- Schellenberg. (1999). “Malaria: An update for physicians”. America. *Infectious Disease Clinics of North*, 26 (2): 243–59.
- Steketee, R. W., Nahlen, B. L., Parise, M. E., and Menendez, C. (2001). The burden of malaria in pregnancy in malaria- endemic areas. *Am J. Trop. Med. Hyg.*, 64: 28–35.
- Stella. (2012). Malaria in adolescence: burden of disease, consequences, and opportunities for intervention. *Lancet Infect Dis*, 2006;6:780-93.
- UDHS. (2015). Uganda bereau of statistics :Uganda demographic and health survey .In Calverton Maryland ,USA UBOS and macro international inc.
- WHO. (2003). The effect of malaria in pregnancy on maternal anaemia and birth weight in rural Malawi., 98:213-221.
- WHO. (2008). The risk and severity of malaria in pregnant women. Report no. 1. Geneva:

- WHO: 1-34. *In: Applied Field Research in Malaria.*
- WHO. (2010). *World Malaria Report, Geneva, Switzerland: World Health Organization.*
- WHO. (2012). World Health Organisation. The World Malaria Report-2012. Washington DC: *World Health Organisation.*
- WHO. (2013). Risk factors for malaria infection and anaemia for pregnant women in the Sahel area of Bandiagara.
- WHO. (2015). An analysis of malaria and immunity in pregnancy. Bull world health organisation.
- William. (2013). A study on Malaria in people's perceptions about Malaria transmission and Control using Mosquito Repellants' plants in a locality in Zimbabwe. *Central African Journal of Medicine: Harare, Zimbabwe.*

APPENDICES

APPENDIX I: CONSENT FORM

TOPIC:| Prevalence of malaria among pregnant women attending focused antenatal care at Iganga Main Hospital Iganga District

I am Mugoya Mwesigwa Phillip a student of Kampala International University pursuing Diploma in clinical medicine and community health.

I beg you for your participation in the above mentioned study the results shall be used in better management of pregnant mothers with malaria infection. Your participation will be at no cost. Little blood will be drawn from you and this procedure will be slightly painful.

There is no penalty if you do not participate and you are also free to withdraw from the study in case you feel like .the data collected from you shall be kept confidential .Initials and not your full names shall be used.

STATEMENT OF CONSENT

I..... Have read and understood this document and therefore I consent and allow taking part in this study

Signature.....Date.....

APPENDIX II: QUESTIONNAIRE

Am Mugoya Mwesigwa Phillip and I would like to find out the prevalence of malaria among pregnant mothers attending ANC at Iganga main hospital your participation in voluntary and the information you give is very confidential and important

NOTE tick the correct answer and write where necessary.

SECTION A|: Demographic data

1. How old are you Below 20? ☐ 20-30 year ☐ Above 30 years ☐

2. Are you single? ☐ Married? ☐ Divorced? ☐

3. Educational level?

Primary (b) Secondary (c) Tertiary (d) None

4. Your occupation

Civil servant

Business personnel

Peasant

Others (specify).....

5. Your religion?

a) Protestant

b) Catholic

c) Muslim

d) Others

SECTION B: Prevalence of malaria.

Table for lab results

Patients No.		
Blood smear	Positive	Negative
Malaria parasite		

SECTION C: control methods

7. Which environmental measures do you use to prevent malaria at home?

yes no

a) Cut grass around the home

☐☐

b) Cover in potholes of water with sand and discard

☐☐

c) Destroy mosquito larvae by chemicals

☐☐

8. Which barrier method do you know that prevents malaria?

a) Use of plain mosquito nets

b) Use of treated mosquito nets

c) Use of mesh wire screens on all windows

d) Wearing clothes that cover lower and upper limbs

9. Which chemical methods do you know that prevent mosquitoes?

a) Repellents

b) Burning indigenous leaves

c) Treated mosquito nets

d) None

APPENDIX III: MAP OF IGANGA DISTRICT SHOWING IGANGA MUNICIPAL CCOUNCIL WHERE IGANGA HOSPITAL IS LOCATED.



