# KNOWLEDGE, ATTITUDES AND PRACTICE ASSOCIATED WITH MALARIA PREVENTION AMONG MOTHERS OF UNDER 5 YEARS CHILDREN IN RUBAGA HOSPITAL KAMPALA UGANDA

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## ABSTRACT

Malaria is a mosquito-borne infectious disease that is responsible for high morbidity and mortality rates among children under five years and pregnant women. Approximately 500 million people are estimated to suffer from malaria infections each year, resulting in about 1-2 million deaths, of whom 90% are children in sub- Saharan Africa. In Uganda, malaria is very common in Rubaga, Kampala City and almost parts of Rubaga Division where it occurs as epidemics. In order to find the level of the knowledge for those mothers descriptive cross-sectional study was carried out to determine the knowledge, attitude and practice of mothers and caregivers towards prevention of malaria from children among mothers with under five years children attending under five OPD services in the health facility of Rubaga. Both qualitative and quantitative methods of data collection will be employed using administered questionnaire. Data was collected using structured open-ended questionnaires; the sample size was one hundred respondents selected by convenient sampling method. The study population consisted of mainly mothers or caretakers of the children aged 15 years and above who visited health care in Kampala City. Data analysis was carried out by use of Excel software. The study revealed that 50% of study participants had completed secondary level education. Regarding knowledge about malaria transmission, majority of respondents correctly associated mosquitoes with malaria transmission (93%) but (20%) of the respondents were not aware man to man transmission through mosquito bite. Concerning prevention of malaria the importance of clearing bushes around homes was reported by the majority of respondents (84%) followed by sleeping under mosquito net and taking antimalarial drugs (82%). Regarding malaria information most of respondents (96%) receive information of malaria and (83%) of the study participants heard the information from health workers in the health facilities. Concerning the attitude of the study participants towards malaria prevention from their children, most of respondents (92%) reported that they will seek treatment and take their children to the health facilities as soon as they see the symptoms of malaria. The study concludes that especial attention should be focused on improving respondents' knowledge about malaria transmission. Particular efforts should be put on malaria awareness related information in schools, and the importance of seeking treatment as early as possible

## DEFINITION OF TERMS

There are a number of operational definitions that frame and help guide this research. These include:

**Knowledge of malaria**

The ability of a person to have a correct understanding of malaria in terms of causative agent, mode of transmission, signs and symptoms, treatment and prevention.

**Attitudes towards malaria**

Beliefs on susceptibility, seriousness, and threat of malaria.

**The practice of malaria prevention**

Routine activities and actions of individuals or groups for prevention of malaria. These include the use of insecticide-treated mosquito nets, using insecticides to spray and control/clear mosquito breeding places.

**Community**

Refers to a group of people living in a particular area and having shared values, cultural patterns, and social problems.

**Malaria management**

Refers to the whole process of recognition of the causes, symptoms, and transmission of malaria and seeking health care for its treatment promptly.

**Malaria control**

Refers a process that requires eradicating the carrier mosquito or reducing man-vector contact so as to cut in the life –cycle of the parasite.

**Introduction**

The name malaria is derived from two Latin words mal; aria meaning “bad air”. This is due to the mistaken believed that it was caused by bad air following the observation that it occurred more frequently around damp places and marshy areas.

Malaria is a hematological infection caused by the mosquito-transmitted protozoan parasites of the genus *Plasmodium*. There are five species known to infect humans, the most serious and sometimes fatal type of malaria is caused by *Plasmodium falciparum*. The other human malaria species, *P. vivax*, *P. ovale*, *P. malariae*, and *P. knowlesi* infection where by occurs only in certain forested areas of South-East Asia. *P.knowlesi* can cause acute, severe illness but mortality rates are low.

Malaria is the most infectious disease in tropical and subtropical regions, and continues to be a major global health problem, with over 40% of the world's population exposed to varying degrees of malaria risk in 100 countries. Approximately 500 million people are estimated to suffer from malaria infections each year, resulting in about 1-2 million deaths, of whom 90% are children in sub- Saharan Africa.(Tangpukdee et al., 2009). The number of malaria cases seems to be increasing globally, due to raising up of transmission risks in areas where malaria control has reduced, the increasing prevalence of drug resistant strains of parasites, The need for effective and practical diagnostics for malaria control worldwide is increasing.(Tangpukdee etal., 2009). since effective diagnosis reduces both complications and mortality from malaria.

However, Malaria continues to be a major impediment to health in Africa, where it frequently takes the greatest toll on young children and pregnant women (WHO, 2005; Hamel et al., 2011; Kendall, 2011). Malaria epidemics in highland areas of East Africa have caused considerable morbidity and mortality in the past two decades (Mouchet et al., 1998; Ernst et al., 2006). About 90% of all malaria deaths occur in Africa south of the Sahara (Sachs, 2002; Sachs and Malaney, 2002; MOH, 2003). More than a million people die of the disease every year, most of them children under the age of five (Coll-Seck et al., 2008; Wandiga et al., 2010). Some children suffer acute attacks of cerebral malaria that lead to coma and death. Others succumb to severe anemia that follows repeated infections or due to the consequences of low birth weight caused by malaria infection in pregnancy (MOH, 2003). In severe cases of cerebral malaria, surviving children may be left with epilepsy, speech disorders and blindness (WHO and UNICEF, 2003; CDC, 2004). In endemic areas, the disease is responsible for 40% of all outpatient visits to clinics and up to 50% of hospital admissions. Malaria consumes a significant proportion of time, money and human resources available to health systems in

Africa (Malaney et al., 2004). Malaria is caused by a protozoan parasite of genus Plasmodium. There are four species of Plasmodia, which infect man: Plasmodium vivax, P. falciparum, P. malariae and P. ovale.

According WHO, in 2017, there were an estimated 219 million cases of malaria in 87 countries. The estimated number of malaria deaths stood at 435 000 in 2017. The WHO African Region carries a disproportionately high share of the global malaria burden. In 2017, the region was home to 92% of malaria cases and 93% of malaria deaths.

**Problem Statement**

Malaria affects an estimated 250 million people each year and is the most wide-spread parasitic disease encountered (Grimberg & Mehlotra, 2011). The disease has a worldwide distribution and is found throughout the tropics, sub-Saharan Africa, and accounts for 90% of the global malaria burden (Breman et al., 2004). The majority of these deaths are children under the age of 5 years. Thus, one child dies of malaria in Africa every 30 seconds, which translates into a tragic 3000 children each day (WHO 2010; Grimberg & Mehlotra, 2011). Many of the children who survive an episode of severe malaria suffer from brain damage and cognitive disability, consequently crippling these families with its debilitating aftermath (Oh & Chishti, 2005).

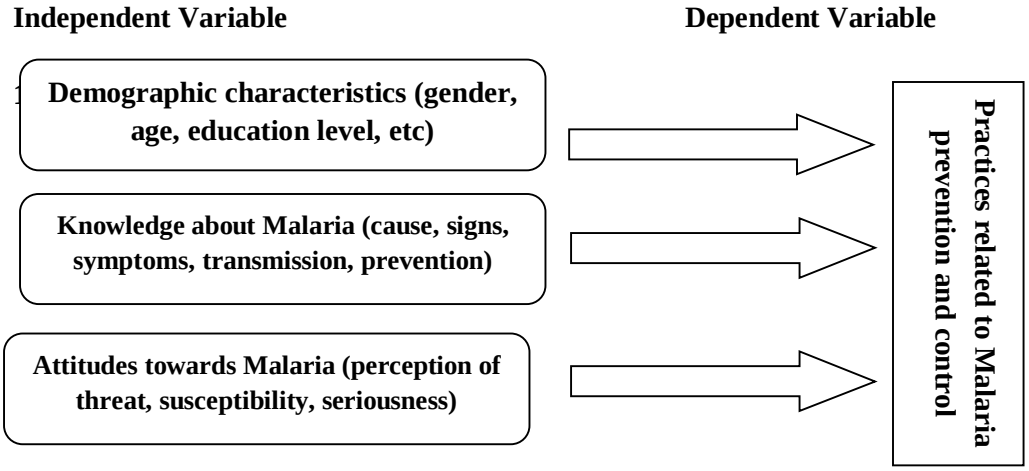
According the world malaria report 2015, it is estimated that there were more than 1300 000 malaria cases and about 4800 malaria deaths in Uganda. Population of Rubaga Division and its surrounding live in and endemic area as most of the area Rubaga Division in addition to that there is no clear understanding on how mothers can contribute prevention of malaria from their children. Therefore is need to assess up to which extent can mothers help their children to prevent malaria and their knowledge, attitude and practice towards prevention of malaria.

***This study aimed assessing mothers' knowledge, attitude and practice towards the prevention of malaria from under five children attending Rubaga hospital in Rubaga Division.***

***Justification of the Study***

Malaria is a major health risk in Uganda, particularly for pregnant women and under five year's children; according the world malaria report 2015, it is estimated that there were more than 1300 000 malaria cases and about 4800 malaria deaths in Uganda. Population of Rubaga Division and its surrounding live in and endemic area as most of the area Rubaga Division, in addition there is no clear knowledge on how mothers can prevent malaria from their children. Therefore is need to assess up to which extent can mothers prevent their children from malaria and their knowledge, attitude and practice towards prevention of malaria.

*Conceptual frame work*




## CHAPTER TWO

## LITERATURE REVIEW

### 2.0 Introduction

**This chapter covered overview of malaria, Pathophysiology, clinical features, diagnosing procedures, treatments, prevention and complications of Malaria.**

About 3.3 billion people – half the world's population – are at risk of malaria due to the main causative parasite, *Plasmodium falciparum (WHO,2008) e*ach year, malaria accounts for up to 1 million deaths worldwide, mostly in children under five (Breman et al., 2004). In 2002, there were as many as 500 million episodes of clinical Plasmodium falciparum malaria infection, and more than two thirds of these cases were in Africa (Snow et al., 2005). More recently, malaria related morbidity and mortality have been significantly worsened by the emergence of widespread drug-resistance (Baird, 2005).

Malaria is an acute febrile illness with an incubation period of 7 days or longer. Thus, malaria
should always be considered when a febrile illness develops one week or more after the first possible exposure.

The most severe form is caused by *P. falciparum*; variable clinical features include fever, chills, headache, muscular aching and weakness, vomiting, cough, diarrhoea and abdominal pain.

Other symptoms related to organ failure may supervene, such as acute renal failure, pulmonary oedema, generalized convulsions and circulatory collapse, followed by coma and death.

The initial symptoms are nonspecific and cannot be distinguished from those of other common febrile illnesses in the locality, such as acute respiratory infections, dengue fever and septicaemia.

Young children, pregnant women, elderly travelers are people who are immunosuppressed and

are particularly at risk of severe Malaria, particularly *P. falciparum*, in non-immune

pregnant travelers malaria increases the risk of maternal death, miscarriage, stillbirth and neonatal death.

Human malaria caused by other Plasmodium species results in significant morbidity,

Cases of severe *P. vivax* malaria have been reported among populations living in (sub) tropical countries with malaria risk. *P. vivax* and *P.ovale* can remain dormant in the liver; relapses caused by the persistent liver forms

("hypnozoites") may appear months and, rarely, several years after exposure. Primaquine is

the only drug that kills the hypnozoites, and thus prevent relapses. Current chemoprophylatic regimens do not prevent relapses. Latent blood infection with *P. malariae* may be present for many years, but it is very rarely life-threatening.

*P. knowlesi* malaria is primarily a public health problem among populations living or working

in forested areas in south-east Asia. In recent years, sporadic cases of travelers' malaria due to *P. knowlesi* have been reported. Humans can be infected with this "monkey malaria" parasite

while staying in – or on the fringes of – rainforests, within the range of the natural monkey

hosts and mosquito vector of this infection. These areas include parts of Brunei Darussalam, Cambodia, China, Indonesia, Lao People's Democratic Republic, Malaysia, Myanmar, Philippines, Singapore, Thailand and Viet Nam. Symptoms may be atypical of malaria. Severe *P. knowlesi* malaria with organ failure may occur, and sporadic fatal outcomes have been described. *P. knowlesi* has no persistent liver forms and relapses do not occur.

**2.5 Precautions**

Travelers and their advisers should note the five principles – the ABCDE – of malaria protection:

• Be **A**ware of the risk, the incubation period, the possibility of delayed onset, and the

main symptoms.

• Avoid being **B**itten by mosquitoes, especially between dusk and dawn.

• Take antimalarial drugs (**C**hemoprophylaxis) when appropriate, at regular intervals to prevent acute malaria attacks.

• Immediately seek **D**iagnosis and treatment if a fever develops 1 week or more after entering an area where there is a malaria risk and up to 3 months (or, rarely, later) after departure from a risk area.

• Avoid outdoor activities in **E**nvironments that are mosquito breeding places, such as swamps or marshy areas, especially in late evenings and at night.

***Mosquito nets*** are excellent means of personal protection while sleeping. Nets can be used either

with or without insecticide treatment. However, treated nets are much more effective. Pretreated nets may be commercially available. Nets should be strong and with a mesh size no larger than 1.5 mm. The net should be tucked in under the mattress, ensuring first that it is not torn and that there are no mosquitoes inside. Nets for hammocks are available, as are nets for cots and small beds.

### 2.6.1 Malaria life cycle

Malaria is caused by an infection from the intracellular Apicomplexan parasites of the *Plasmodium* genus. The genus consists of unicellular, eukaryotic protozoan parasites with a number of different species affecting humans including *P. falciparum* (the most severe form), *P. malariae, P. vivax* and *P. ovale* (Hoffman *et al.*, 2002). The parasites of the Apicomplexan phylum have complex life cycles and are all characterised by the presence of a special apical complex that is involved in host-cell invasion and which includes the microneme, dense granules and rhoptries (Figure 1.2) (Cowman and Crabb, 2006).

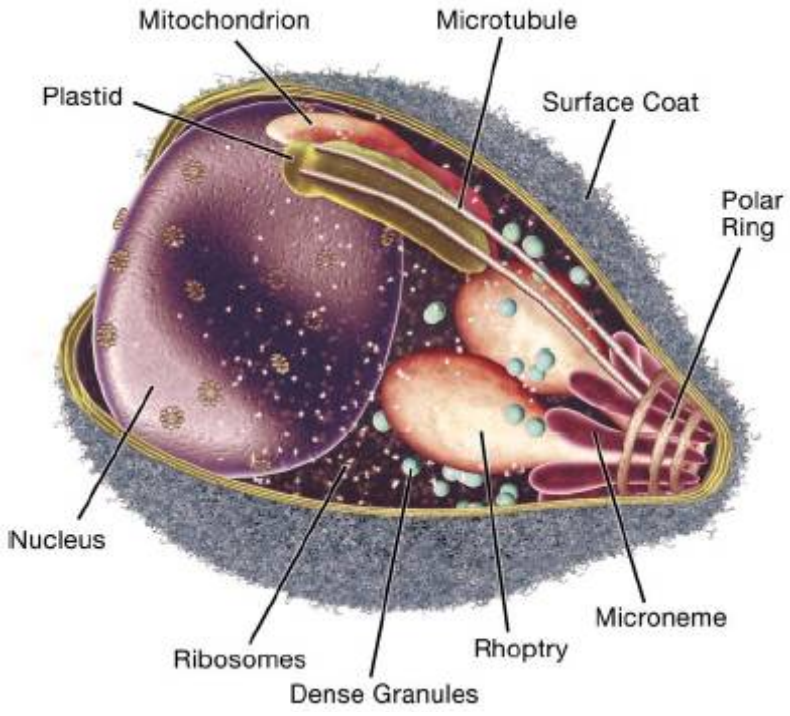


**Figure 2.1: The *P. falciparum* merozoite showing the apical complex and other major cellular organelles and structures.**

Taken from (Cowman and Crabb, 2006).

*P. falciparum* parasites invade host cells in order to acquire a rich source of nutrients. At the same time, these cells protect the parasites from host immune responses. The parasites are transmitted by the female *Anopheles gambiae* and *A. funestus* (Southern Africa) mosquitoes, which serve as vectors for the sexual reproduction of the parasites while the mammalian host provides the parasites with a niche for asexual development. The mosquitoes inject a sporozoite form of the parasites into the subcutaneous layer of the host skin during a blood meal.

The sporozoites rapidly move to the liver where they infect the hepatocytes and differentiate into thousands of merozoites. These are subsequently released into the bloodstream where they invade erythrocytes.

This invasion characterises the onset of the intra-erythrocytic asexual blood stage of the parasitic life cycle. The parasite cycles through ring, trophozoite and schizont stages and in so doing produce between 16 and 32 daughter merozoites per erythrocyte egression. This is accompanied by the characteristic bursts of fever and anemia associated with the disease. The daughter merozoites repeat the asexual cycle by invading free erythrocytes (Figure 2.2a). Some intra-erythrocytic stages, however, develop into male or female gametocytes that are ingested by the mosquito during its next blood meal. These develop into male and female gametes inside the mosquito's gut where they fuse to form diploid zygotes. The zygotes differentiate into ookinetes that subsequently cross the midgut and develop into oocysts from which sporozoites are released. These sporozoites are stored in the salivary glands and are once again injected into the human host by the mosquito to repeat the parasitic life cycle, and thus increasing the number of malaria infectious cases (Wirth, 2002).

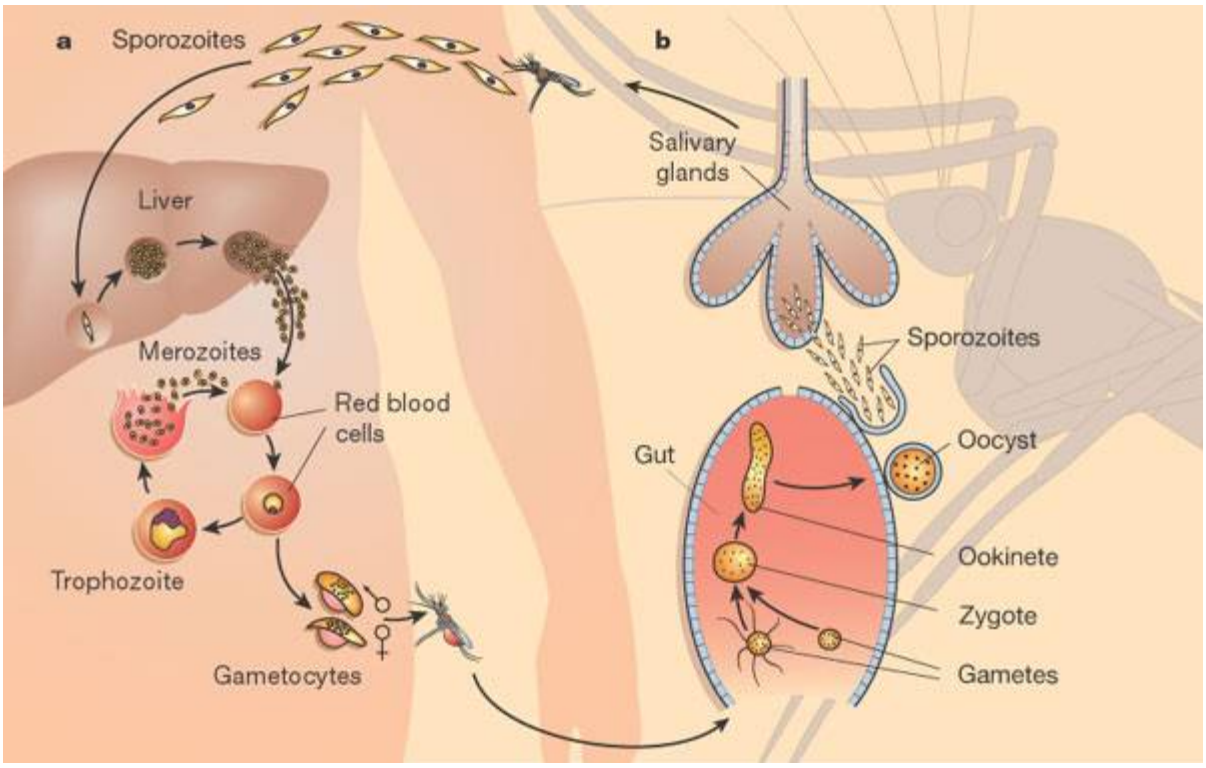



**Figure 2.2: The life cycle of the *P. falciparum* parasite.**

(a) The asexual stage of the *P. falciparum* life cycle within the human host, (b) the sexual stage within the mosquito host (Wirth, 2002).

### 2.8 Diagnosis

Since the disease is so common in the tropical world, cerebral malaria should be considered in every comatose patient with a history of fever who has been in a malarious area in the previous two months. The diagnosis should be confirmed by microscopy of stained thin and thick blood films, at a magnification of 1000. The intraerythrocytic parasites have to be identified and counted. In severe malaria, the developmental stage of the parasites and the percentage of neutrophils containing malarial pigment should also be noted, since these have prognostic significance(Phu et al., 1995). A negative blood smear makes the diagnosis very unlikely, but if there is still uncertainty the test should be repeated every 12 hours for 48 hours. Microscopy with fluorescent staining of the buffy coat (quantitative buffy coat analysis or QBC) has a higher sensitivity to detect low parasitemias, but this is seldom needed. Dipstick detection of the P. falciparum antigens PfHRP2 and pLDH (Parasight-F, ICT Malaria Pf, OptiMAL), have a diagnostic sensitivity similar to that of microscopy, but do not require an experienced microscopist(Grobusch et al., 2002), However, parasitemia and parasite stages cannot be assessed in this way. PfHRP2 remains circulating weeks after cure, which can result in false positive results in high transmission settings in patients with a recent malaria attack.

Hypoglycaemia, a common feature of severe malaria, should be ruled out. The principal differential diagnosis in tropical areas is of a bacterial or viral meningoencephaltits. If the patient presents with any sign of meningeal involvement a lumbar puncture should be performed. Especially in small children this implies that in most cases a lumbar puncture will be necessary. Some African centres treating pediatric cerebral malaria postpone lumbar puncture fearing herniation related to raised intracranial pressure which is present in a majority of their cases. These centres start empiric antibiotic coverage in all children until results of lumbar puncture become available.

***Treatment of young children***

Acutely ill children with falciparum malaria require careful clinical monitoring as their condition

may deteriorate rapidly. Every effort should be made to give oral treatment and to ensure that it is retained. ACT may be used, in accordance with national policy, as first-line treatment while abroad. Oral treatment options for SBET and returning travelers are: artemether–lumefantrine, atovaquone–proguanil, dihydroartemisinin–piperaquine, and quinine plus clindamycin.

Quinine plus doxycycline is an option for children aged 8 years and older. Parenteral treatment andadmission to hospital are indicated for young children who cannot swallow antimalarials reliably.

Chloroquine or dihydroartemisinin−piperaquine or artemether−lumefrantrine can be safely given to treat *P. malariae*, *P. ovale* or *P. vivax* infections in young children. The lower age limit for anti-relapse treatment with primaquine is 6 months.

**2.13 Malaria burden in Uganda**

As per WHO report there are limited national data and statistics on the burden of malaria in Uganda, it is considered a major public health problem in the country. The dominant malaria species in the country has been Plasmodium falciparum accounting more than 95%. However, increased proportion of P. vivax has been reported from North-west (Somaliland) and North-east (Puntland) zones. A screening of patients with fever of history of attending the Bosaso regional hospital during 4 January to 14 February 2016 revealed 37.0% (258/697) 12.8% (89/697) of *P. falciparum* and *P. vivax* respectively indicating that *P. vivax* accounted for 25.6% of the infections. Mixed infection accounted for 0.4% (3/697). In 2015, a total of 88 139 cases, of which only 17913 were laboratory confirmed, were reported (annex 1). However, the reported figure seems far below the real burden considering that: 70% of people suffering from malaria symptoms seek help outside public health facilities; the performance of the health information system as a whole is far from satisfactory; recording of malaria cases at maternal and child health centres is poor; reporting by health facilities to WHO is irregular, inaccurate and incomplete.

On the other hand, owing to the inadequacy, inaccessibility and non-availability of public health care facilities with reliable laboratory diagnostic facilities for the confirmation of malaria, over diagnosis of malaria remains a serious problem. In most cases, the diagnosis of malaria is clinical and based only on fever or a history of fever. This makes it difficult to arrive at a true estimation of the malaria burden. The *World malaria report 2015* estimated that there were 310 000-1 300 000 cases of uncomplicated malaria and 42-4800 malaria deaths in Uganda.

**Malaria treatment**

***Anti-malarial drug efficacy***

Drug efficacy studies were conducted by WHO in 2004─2006 for monotherapies of chloroquine, amodiaquine, and sulfadoxine–pyrimethamine; and artemisinin-based combination therapies of artesunate plus sulfadoxine–pyrimethamine and artesunate plus amodiaquine in three sentinel sites in Uganda. These studies revealed a high level (>76%) of treatment failure with chloroquine. The levels of treatment failure with amodiaquine monotherapy in the three sites were 2.8%, 8% and 23%, while treatment failure with sulfadoxine–pyrimethamine was between 8% and 12 %.

The findings from these studies however demonstrated that the artemisinin-based combination therapies were highly efficacious, with cure rates of 98%─100%. With the efficacy of sulfadoxine–pyrimethamine as monotherapy above 80%, it was suitable for use as a combination partner with artesunate. Thus artesunate plus sulfadoxine–was recommended as first-line drug for the treatment of uncomplicated falciparum malaria in 2005. The efficacy of artesunate plus sulfadoxine– was assessed in 2011 and 2015 and revealed 12-22% treatment failures, while in 2013 and 2015, efficacy studies on artemether+lumefantrine, the second-line drug, revealed a cure rate of more than 97%. .

**Malaria diagnosis**

In all patients suspected of malaria, anti-malarial treatment should be provided on the basis of parasitological confirmation, either by microscopy or rapid diagnostic test.. Where there are no laboratory facilities, malaria diagnosis should be based on clinical signs and symptoms using the Integrated Management of Childhood Illness algorithm.

Rapid diagnostic tests detect specific antigens (proteins) produced by malaria parasites. These antigens are present in the blood of infected, or recently infected, people. The rapid diagnostic test signifies their presence by a colour change on an absorbing nitrocellulose strip. The rapid diagnostic test recommended for Uganda is the one that detects only *Plasmodium falciparum* species by detecting histidine-rich protein-2.

For all malaria cases in all malaria transmission settings, and where diagnostic testing (by microscopy or rapid diagnostic) is feasible, it is recommended that artemether+lumefantrine treatment is only given to confirmed cases). Results of all rapid diagnostic tests and blood smears performed should be registered in the facility registers. In areas where there are presently no diagnostic services, treatment with artemether+lumefantrine in the interim should be based on clinical diagnosis.

**Possible causes of treatment failure are:**

Vomiting, poor quality or counterfeit anti-malarial drugs, previous prescription of an incomplete course, poor adherence, parasite resistance.

In case of treatment failure, the patient should be given the second-line treatment (dihydroartemisinin+piperquine).

In case fever and parasitaemia recur after 4 weeks, these patients should be treated as new infection and be given artemether+lumefantrine.

**Chemo-prevention of malaria in pregnancy**

Malaria in pregnancy is always a serious disease and therefore needs to be treated promptly with safe anti-malarial drugs and other supportive therapy for . For prevention of malaria in pregnancy in Uganda, all pregnant women in moderate to high transmission areas should receive recommended anti-malarial drug sulfadoxine–pyrimethamine as intermittent preventive treatment during the scheduled ANC visit. The first dose should be administered as early as possible during the 2nd trimester of gestation (determined by the onset of "quickening" or by fundal height by ANC personnel). Each SP dose should be given at least 1 month apart and up to delivery.".

Malaria in pregnant women is estimated to be a major cause of maternal and low birth weight in babies. Atypical manifestations of malaria are common in pregnancy, particularly in the second half of the pregnancy. is more common and severe between 16 and 29 weeks. increases the risk of perinatal mortality, maternal mortality and morbidity. Risk of malaria for pregnant women in moderate to high transmission zones is high and intermittent preventative treatment (sulfadoxine–pyrimethamine) is recommended.

In Uganda, Intermittent preventive treatment with sulfadoxine–pyrimethamine is recommended only in the southern and central zones of Uganda where malaria is mesoedemic with hyperendemic pockets. The drug should be given during the second trimester and third trimester with a minimum interval of 1 month,

**Follow-up**

If fever and other symptoms persist in a patient who has started malaria treatment, the patient should be advised to return to the health post within 72 hours (3 days). However, patients should also be advised to come at any time even before 72 hours if there is a need or a worsening in the clinical condition. For all patients who come back to the health post, a full assessment should be carried out and appropriate action taken: assess the overall condition of the patient; if the patient has not taken the treatment, administer first-line treatment (artemether+lumefantrine; if patient has taken artemether+lumefantrine correctly and still has clinical signs and symptoms of malaria, refer to the nearest maternal and child care centre/outpatient department or hospital.

**Definition**

Severe malaria is a medical emergency. It is defined as *P. falciparum* malaria that is sufficiently serious to be an immediate threat to life and that requires hospitalization. Usually it is a result of delayed, inappropriate or inadequate treatment of uncomplicated malaria.

Pregnant women, young children and severely malnourished patients are specifically at risk of developing severe malaria in Uganda.

**Signs and symptoms**

A patient with severe falciparum malaria may present with one or more of the following clinical or laboratory features.

***Clinical features***

Clinical features include: impaired consciousness or unarousable coma not attributable to any other cause in a patient with falciparum malaria; prostration, i.e. generalized weakness so that the patient is unable walk or sit up without assistance (affected children are unable to feed); repeated convulsions – more than two episodes in 24 hours; deep breathing, respiratory distress (acidotic breathing); pulmonary oedema and adult respiratory distress syndrome; circulatory collapse or shock, systolic blood pressure <70 mmHg in adults and <50 mmHg in children; abnormal spontaneous bleeding; jaundice with evidence of other vital organ dysfunction.

**Diagnosis**

A patient presenting with fever and any of the above-mentioned signs and symptoms is a suspected severe malaria case until laboratory tests results are available for confirmation. They should be treated without delay. Laboratory tests (microscopy or rapid diagnostic tests) will determine if the patient is a confirmed severe malaria case or not.

## CHAPTER THREE

## METHODOLOGY

### 3.0 Introduction:

This chapter presents methodology of the study

### 3.1 Study design

It was a descriptive and cross-sectional study, both qualitative and quantitative methods of data collection was employed using administered questionnaire. Study subjects interviewed were selected using convenient sampling method, selecting first hundred mothers who gave their consent to participate the research.

### 3.2 Sampling procedure:

Convenient sampling was used selecting first hundred subjects who attend the clinic and give consent and they were eligible to participate in the study.

### 3.3 Data Analysis

The data was captured into MS Excel software cleaned, checked for consistency and then analyzed. The result presented on tables and graphs.

## CHAPTER FOUR: RESULTS

### 4.1 Socio- demographic characteristics of respondents:

**Table 1:**

| VARIABLE | FREQUENCY | PERCENTAGE |
|---|---|---|
| **A. Distribution of respondents by gender** | | |
| i. Female | 82 | 82% |
| ii. Male | 18 | 18% |
| **TOTAL** | 100 | 100% |
| **B. Distribution of respondents by age** | | |
| i. 15-25 | 48 | 48% |
| ii. 26-35 | 45 | 45% |
| iii. 36-45 | 5 | 5% |
| iv. Above 45 | 2 | 2% |
| **TOTAL** | 100 | 100% |
| **C. Distribution of respondents by marital status** | | |
| i. Single | 24 | 24% |
| ii. Married | 68 | 68% |
| iii. Divorcee | 1 | 1% |
| iv. Widow | 7 | 7% |
| **TOTAL** | 100 | 100% |
| **D. Distribution of respondents by level of education** | | |
| i. Tertiary | 15 | 15% |
| ii. Secondary | 35 | 35% |
| iii. Primary | 12 | 12% |
| iv. Informal education | 22 | 22% |
| v. None | 16 | 16% |
| **TOTAL** | 100 | 100% |

| | | |
|---|---|---|
| **E. Distribution of respondents by occupation** | | |
| i. Formally employed | 15 | 15% |
| ii. Self-employed | 39 | 39% |
| iii. Housewife | 31 | 31% |
| iv. Others | 15 | 15% |
| **TOTAL** | 100 | 100% |

According table 1 above the female (82%) respondents were more than male (18%) respondents due to the fact that majority care taker for the children are female and they usually take the sick children to the health facilities.

The study further revealed that, majority of the respondents were of age between 15 to 25 years old (48%), followed by those between 26 to 35 years old (45%), while those above 45 were the least with only (2%) of total respondents.

Marital status of the respondents found out that, majority (68%) were married followed by single (24%) of the respondents, while divorcee was the least with only (1%) of total respondents.

Level of education of study participants, Table 1 above revealed that majority of care takers had attained secondary level of education (35%) followed by those who had attained informal education (22%) and those who never went to school (16%), tertiary level attained (15%) of the respondents as those with primary level were the least with only 12% of the total number of respondents.

Another social characteristic was occupation of the study participants and the majority (39%) of the respondents was self-employed, followed by housewife (31%) and formally employed (15%) as well as others (students and Farmers) were (15%) of total respondents.

**4.3.1 Respondents knowledge on Malaria transmission:**

**Table 2:**

| **VARIABLE** | **Frequency** | **Percentage** |
|---|---|---|
| i. Mosquitoes bite transmits malaria | 93 | 93% |
| ii. Cannot be transmitted from person to person | 21 | 21% |
| iii. Can be transmitted from another person with malaria | 65 | 65% |
| iv. Dirty environment with stagnant water can enhance transmission | 92 | 92% |

Table 2 Study revealed that, the majority 93% of the respondents believed that mosquito bite transmits malaria, where 21% to 65% of the respondents believed that infected person with malaria can transmit malaria to another person, and 92% of the respondents believed that stagnant water can enhance the transmission.

**4.3.2 Knowledge of Signs and Symptoms:**

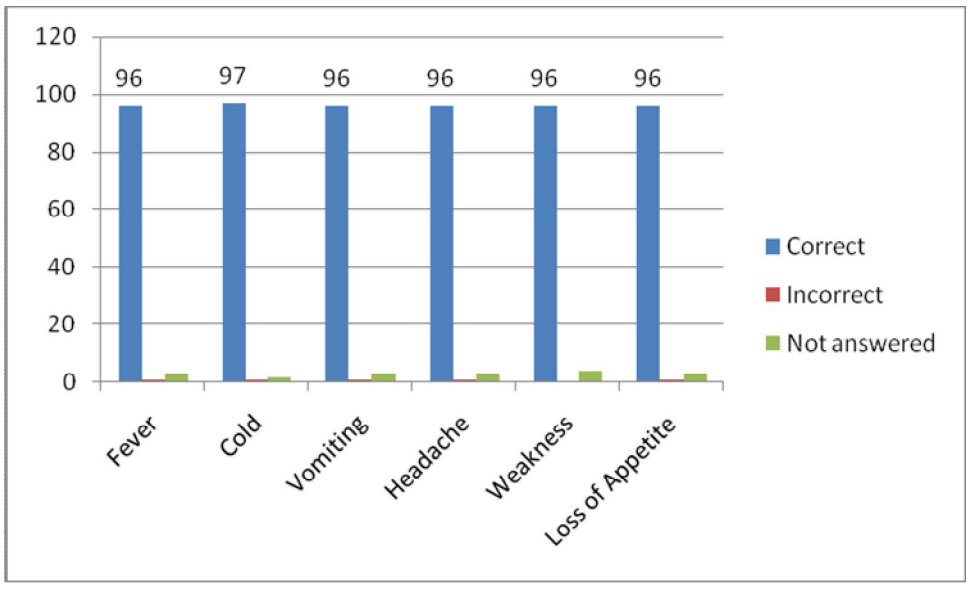
**Table 3:**

| VARIABLE | Frequency | Percentage |
|---|---|---|
| i. Fever | 96 | 96% |
| ii. Cold | 97 | 97% |
| iii. Vomiting | 96 | 96% |
| iv. Headache | 96 | 96% |
| v. General body weakness | 96 | 96% |

**Table 3:** The majority of the respondents (96% to 97%) were well understood majority of the signs and symptoms of the malaria.

**Figure 2:**

Shows the majority of respondents 96% to 97% selected the corrected answer, 3% of the respondents answered incorrectly and 1% of the respondents did not answer as summarized in figure 1.




**4.3.3 Sources of information about malaria**

**Figure 3:**

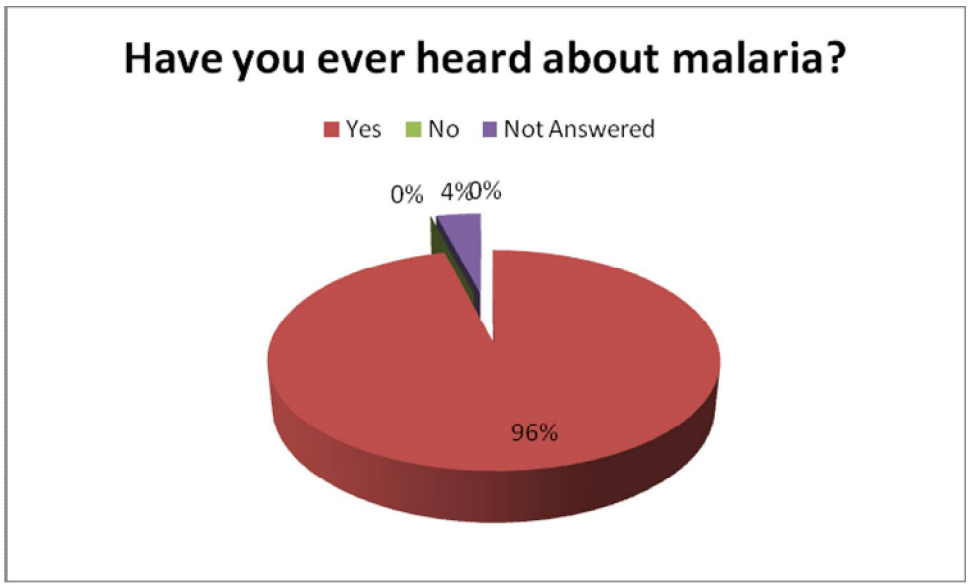



Figure 2 the study revealed that respondents, 96% reported having received some information about malaria, while 4% not answered as summarized in Figure 2.

**Figure 3.1:**

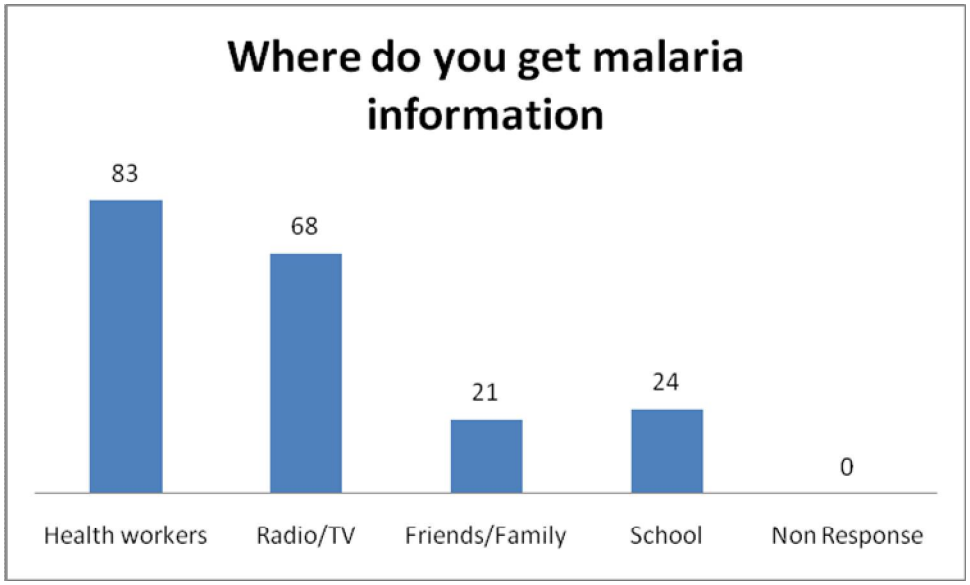



**Figure 3.1: Respondents who reported receiving information about malaria**

Sources of information varied amongst respondents, and some of the respondents obtain the information from more than once source, for this reason the figures may overlap. Health workers are the main source as (83%), of the respondents received information from them, followed by the Radio/Tv (68%) and school (24%) and family members and friends (21%) were the most common sources of information amongst those that had received information about malaria as indicated in Figure 3.

### 4.3.3 Respondents Knowledge on Malaria Prevention:

**Figure 4:**

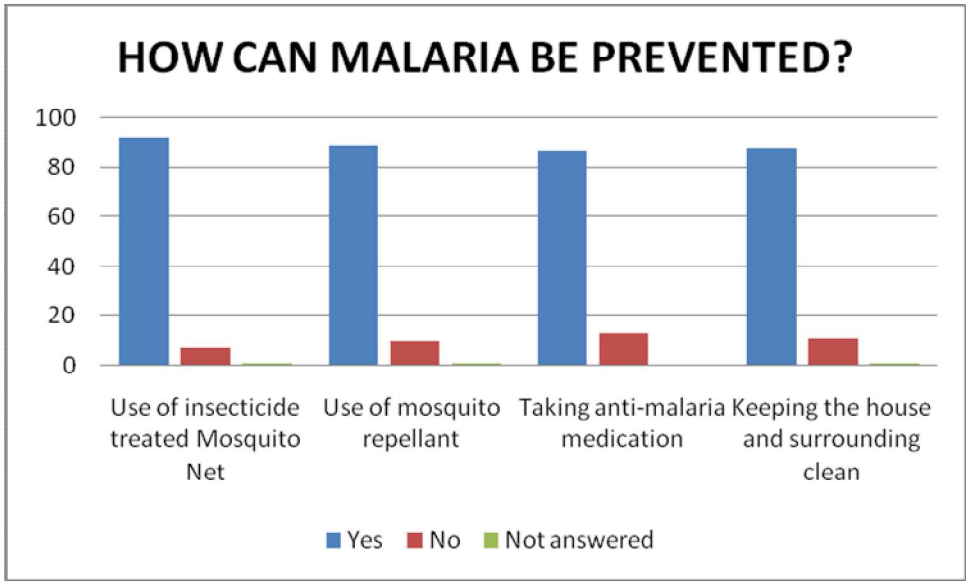



Figure 4 the study discovered that majority (97%) of the respondents answered correctly the ways that can be prevented malaria, where about 3% answered incorrectly and 1% of the respondents never answered the question, as figure 3 shows.

### 4.3.4 Attitudes towards malaria

Respondents answered a combination of positive and negative statements to help gauge their attitude towards malaria using a 4-point likert's scale ranging from -strongly agree to -strongly disagree.

**Table 4:**

| Statement | Strongly agree /Agree | Strongly disagree/ Disagree |
|---|---|---|
| Malaria prevention is highly important in children because it is serious and life threatening | 100% | 0% |
| To prevent malaria me and my child must avoid mosquito bite | 99% | 1% |
| Sleeping under mosquito net is one way to prevent getting malaria | 90% | 10% |
| I might be at greater risk if my environment is overgrown with bushes | 98% | 2% |
| It is dangerous when malaria medicine is not taken completely | 95% | 5% |
| I believe that I should go to the clinic every time I suspect my child has malaria | 92% | 8% |
| I can easily and cheaply treat myself and my baby if we have malaria | 74% | 26% |
| It is possible to recover from malaria without treatment so no need for serious need incurring preventive costs | 61% | 39% |

| | | |
|---|---|---|
| People who have malaria should be isolated to prevent its spread | 7% | 93% |

**Table 4,** the study revealed that respondent's attitude and knowledge towards malaria were variable, attitude on prevention using mosquito net, clearing the surroundings environment from bushes, and visiting to the health facility and seeking treatment when the child is sick scored over (90%), attitude on the malaria treatment over (60%) of the respondents believed that is impossible to recover from malaria without treatment, and there is availability of malaria treatment in health facilities; at the other side attitude on the care of the patient with malaria (93%) of the respondents believed that, there is no need to isolate patient with malaria.

**4.3.4 Malaria Prevention Practice:**

**Figure 5:** shows how study participants practice malaria prevention.

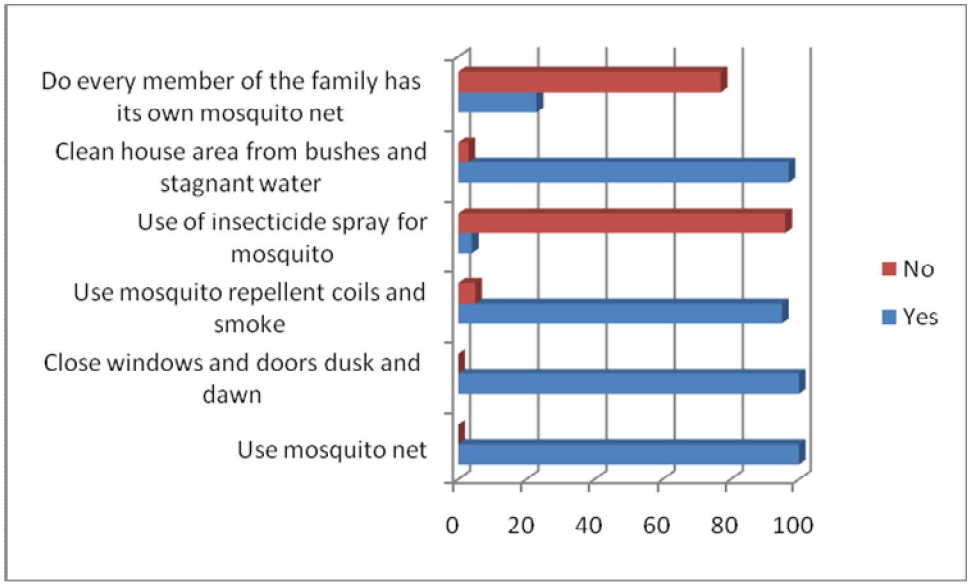



Figure 5 the study revealed high number of the families (>70%) have no equivalent or equal mosquito net and family members, the study participants reported that several children share one mosquito net. At the other side majority of the study participants (>90%) reported that they close doors and windows at dusk and dawn and clean house areas from bushes and stagnant water. More than 80% of the studies of the participants use mosquito repellents; in addition to that more than 90% do not use insecticides sprayers; while more than 90% of study participants reported that they sleep under mosquito net.

## CHAPTER FIVE: DISCUSSIONS OF THE FINDINGS, CONCLUSIONS AND RECOMMENDATIONS

**5.1 Response rate**

This study achieved a quantitative data response rate of 100%. This is significantly similar to rates encountered by other researchers. For instance, in Ethiopia of 99.3% and 98.4% (Mihret & Mesganaw, 2007; Merihun et al., 2015) and 100% in Tanzania (Bintabara et al., 2015). This is because in this study, all mothers selected were interested in its aims and objectives as they give their consent to participate the study.

**5.2 Socio-demographic factors**

The gender of the participants of the study 82% was female and 18% was male, the gap between the gender distributions was that the caretakers are usually mothers of the children.

This study established that most of the study participants were in the 15-25 years' age groups (48%) (*see table 1*) flowed by participants between the age group of 26-35 years (45%).

**5.4 Knowledge on modes of transmission**

Most of the study participants knew very well the different modes of malaria transmission, Almost all the study participants related the transmission of malaria with mosquito bite (93%), in addition to that same number of study participants reported that there is environmental factors (stagnant water and bushes around homes) that contribute malaria transmission, but nearly the quarter (21%) of study participants reported that there is no man to man transmission of malaria (*See table 2*).

**5.5 Knowledge on signs and symptoms of malaria**

The study population was mostly knowledgeable about the signs and symptoms of malaria infections. Feeling cold/chills was reported by majority of respondents ((97%) as a common sign of the disease. Headache, aching joints, vomiting and lack of appetite were reported as other symptoms of malaria. All these signs and symptoms are in agreement with documented literature on the common clinical symptoms and signs of *falciparum* malaria (Greenwood *et al.,* 2008). This indicates that Rubaga residents are generally aware of how malaria presents itself.

**Recomendations**

1. Attention should be focused on improving respondents' knowledge about malaria transmission and appropriate preventive measures for controlling malaria
2. Efforts should be put on malaria awareness in schools, to raise knowledge of malaria in the community through students
3. Community healthcare service providers should include provision of affordable or free mosquito net.
4. Counselling of communities on the importance of seeking treatment as well as availability and affordability of malaria treatment for every sick person.

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