ASSESSING THE PREVALENCE OF MALARIA AND ASSOCIATED FACTORS AMONG UNDER 5 CHILDREN. A CASE STUDY AT NTAJA HEALTH CENTER IN MACHINGA DISTRICT.

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A RESEARCH PAPER SUBMITTED TO THE FACULTY OF BEHAVIOURAL AND SOCIAL SCIENCES IN PARTIAL FULFILMENT FOR THE REQUIREMENTS FOR THE AWARD OF BACHELORS DEGREE IN PUBLIC HEALTH.

LAKE MALAWI ANGLICAN UNIVERSITY

LILONGWE

NAME OF SUPERVISOR: WELLINGTON LIMBE

OCTOBER, 2023

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DECLARATION

I hereby declare, to the best of my understanding that this research study is my original effort and has never been presented to this University or any other institution of higher learning for a scholarly award. I therefore present it for the award of a Degree of Bachelor of Science in Public Health at Lake Malawi Anglican University.

Signature :

Maxwell Kumwembe

Date : 9th September, 2024.

<div align="center">CERTIFICATE OF APPROVAL</div>

I, undersigned, certify that this thesis is a result of the author's own work and that to the best of our knowledge, it has not been submitted for any other academic qualification within Lake Malawi Anglican University or elsewhere. The dissertation is acceptable in form and content and that satisfactory knowledge of the field covered.

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My sincere thanks go to my family members especially my Wife Gladys Kumwembe for the time, spiritual and moral support, my supervisor Mr. Wellington Limbe for his generous support and guidance right from the proposal writing and full report writing to submission of the whole work. All my class mates especially my group members for that love encouragement you bestowed to me. Thank you all for giving me your time and a chance to accomplish my work. God almighty bless you.

DEDICATION

I dedicate this research work to my family members especially my Wife Gladys Kumwembe, God almighty bless you.

ABSTRACT

In Malawi, malaria is also a major public health problem in Malawi where an estimated 4 million cases occur each year. Children under the age 5 are most likely to have severe illness.

According to the records available at Ntaja Health Center in Machinga has created the reason why there is a need to identify the malaria prevalence and associated factors among children below the age of five years attending Ntaja health Center in a radius of five kilometres in Machinga District.

Specific objectives are to;

1) To identify care giver factors associated with prevalence of malaria among children below five years.
2) To assess the environmental factors contributing to the prevalence of malaria amongst children below five years.
3) To find out the household factors associated with prevalence of malaria amongst children below the age of five.

This study used quantitative approach and cross-sectional survey design respectively.

The prevalence of malaria among children below age five was very high with as almost half of the sample size of children.
Level of education was the only demographic factor that significantly influenced the prevalence of malaria among under five children.
Knowing that malaria causes high temperatures, vomiting, and headache were the only caretaker factors that influenced prevalence of malaria.
Type of the house, Source of light, time to go to bed and the use of mosquito net was the only household's factors that significantly influenced prevalence of malaria.
Similarly, occurrence of malaria among children below five years was significantly influenced by not clearing stagnant water, poor drainage system, have bushes around the home environment. The following are the recommendation;
Reinforce the community on change behaviour and attitudes towards the control and prevention of malaria. Clear all stagnant waters, bushes around home environment as these are bleeding places for mosquitoes.

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LIST OF ACRONYMS AND SYMBOLS

SP   Sulfadoxine -Pyrimethamine

IPT   Intermittent Preventive therapy

IRS   Indoor Residual Spraying

MOH   Ministry of Health

WHO   World Health Organization

UNICEF   United Nations Integrated Children Fund

LLINs   Lasting Insecticide Treated Nets.

MIS   Malaria indicator survey

ACT   Atemethisine Insecticide Treated nets

CDC   Center for disease control

VHT   Village Health Team

ICCM   Integrated Case Control Management

IMCI   Integrated Management of childhood illness

OPD   Out Patient Department.

MCP   Malaria Control Program

NMCS   National malaria control Strategy

QC   Quality Assurance

1.0 CHAPATER ONE: INTRODUCTION

1.1 Introduction

Malaria is none of the world's deadliest disease caused by an infection with single called parasitic female anopheles mosquito. This remains a burden especially in the sub-Sahara Africa despite all the efforts put in by the various countries to control and eradicate the disease in these areas. Its problem has further contributed to low economic progress especially among countries that have been affected by the disease.(NMCP, 2017).

1.2 Back ground of the study

World health organization defines malaria as a life threatening parasitic disease caused by a bite of an infected female anopheles mosquito. (WHO) (malaria fact sheet updated December, 2016). Malaria can kill within 24 hours of onset of symptoms and whereas it affects all people but the most affected children are those under the age of five.

Malaria has been and continues to be if not checked and controlled the number one parasitic killer disease globally that affects children mainly less than five years' dues to their low immunity. Malaria is an entirely preventable and treatable mosquito Bourne illness. (WHO-world malaria day,2016).

Globally, over 95 countries and territories have on going malaria transmission with estimated of 3.2 billion people at risk of getting infected. The world health organization (WHO) indicates that 214 million people are infected with malaria world wide and 438,000 cases result in death. Children under five are particularly susceptible to malaria illness which kills an estimated 303,000 before the age of five years globally including 292,000 in the African region. (WHO world malaria report 2016).

According to WHO the malaria prevalence depends on the possible environmental factors related to parasite, vector, the human host and the environment. The transmission is also observed more in places where the life span of the mosquito is longer favouring the parasite to develop completely in a mosquito increasing the transmission and therefore high prevalence of malaria. The climatic conditions such as rainfall patterns, temperatures and humidity also affect the number and survival of mosquitoes and many places, transmission is seasonal and high in rainy

season and immediately after rainy season. More transmission and epidemics can occur in people who have little or immunity to malaria. (WHO world malaria report 2017).

Sub-Sahara-Africa continues to carry a high portion on global malaria burden with 90% of malaria cases and 92% of malaria deaths, children being particularly vulnerable accounting for 70% of all the malaria deaths. Malaria remains the major cause of morbidity in children in sub-Sahara Africa under the age of 5 years and one child die after every 2 minutes (WHO world malaria report, 2025).

As one of the most serious and complex public health problem, malaria is identified as the disease most likely to be affected by the climate change and this allows the spread to newer areas together with the prevailing social-economic conditions. The mean temperatures are also highly associated with malaria prevalence in Malawi. (citation).

In Malawi, malaria is also a major public health problem in Malawi where an estimated 4 million cases occur each year. Children under the age 5 are most likely to have severe illness. It is endemic in more than 95% of Malawi. Its transmission is perennial in most parts of the country and peaks after the start of the annual rains that typically begin in November/December and last through April. The highest transmission areas are found along the hotter, wetter and more humid low-lying areas (lake-shore, shire River valley and central plain), while the lowest risk areas fall along the highlands of Rumphi, Mzimba, Chitipa and Kirk Range.

Ntaja Health center in Machinga district where the study is located, malaria is the most common cause of death in children under the age of five years and the district suffers the highest malaria burden in the country. This create a reason to find out the prevalence of malaria and the associated factors in children below the age of five years, five kilometres radius from Ntaja Health Center.

1.3 Statement of the problem.

The government's long term objectives are to ensure total eradication of malaria in all the endemic areas of the country and as such, a lot of effort though funding has been sourced both internally and externally towards the above cause. A lot of sensitization and prevention measures of malaria such as education of individuals and families to sleep under insecticide treated nets, vector control though spraying (IRS), eliminating breeding places and reducing infections though

prophylaxis and treatment with ACTs. The government has also through the year 2009-2015 conducted several programs including integrated community case management (ICCM), integrated management of childhood illness (IMCI) and training of VHTs to offer curative malaria treatment at community level. (Danielle Roberts, Glenda Mathews).

Despite all these efforts, malaria cases continue to remain high and one of the leading causes of ill-health and death in Machinga. According to the records available at Ntaja Health Center in Machinga district, the trend for the last two years indicate that those under five children who were tested for malaria in 2020 was 28,414 and 16,424 were positive for malaria parasites representing 57.8% while in 2021 those tested were 21,931 and 15,824 were found positive for malaria parasite representing a 72.2% with 14.4% increase. The under five deaths due to malaria was 240 in 2020 and 327 in 2021 representing a 73%. This is the reason why there is a need to identify the malaria prevalence and associated factors among children below the age of five years attending Ntaja health Center in a radius of five kilometres in Machinga District.

1.4 Objectives

1.4.0 Main objectives

To determine the prevalence of malaria and the associated factors among children under the age of five who attend OPD of Ntaja health center at five kilometres radius in Machinga District during the period of December 2022-February,2023.

1.4.1Specific objectives

4) To identify care giver factors associated with prevalence of malaria among children below five years who attend OPD five kilometres radius from Ntaja Health Center, Machinga district in the month of July, 2023.
5) To assess the environmental factors contributing to the prevalence of malaria among children below five years who attend OPD five kilometres radius from Ntaja Health Center in Machinga District in the month of July 2023.
6) To find out the household factors associated with prevalence of malaria among children below the age of five who attend OPD five kilometres radius from Ntaja Health center in Machinga district in the month of July,2023.

1.5 Research questions

1) What are the care giver factors associated with the prevalence of malaria among children less than five years who attend OPD five kilometres radius from Ntaja Health Center in Machinga District?

2) What are the environmental factors associated with malaria prevalence in children less than five years who attend OPD five kilometres radius in Machinga District?

3) What household factors are associated with malaria prevalence in children below five years who attend OPD five kilometres radius from Ntaja Health Center in Machinga District.

1.6 Significance of the study

Despite the availability of malaria control measures, the morbidity and mortality in children under five years of age is still unacceptably high. This is study is therefore to help to identify the factors associated with malaria prevalence and help the concerned authorities to plan and sensitize the community about the above factors and put in place strategies to help reduce on the number of malaria cases in the community. This will help reduce overcrowding in the health units and referrals due to complicated malaria; this will be an essential component in the effectiveness of malaria control and elimination in the already existing strategies that are being scaled up hence re-align the effectiveness in the malaria control measures. This study is also as a requirement for fulfilling my bachelor's degree which will also help in the future literature review by other researchers.

1.7 Scope of the study

This study was carried out in Ntaja, five kilometres radius from Ntaja Health Center in Machinga District in the month of January and February, 2023. The study aimed at determining the prevalence of malaria and the associated factors which include care taker factors, household factors and environmental factors among children below five years who attend OPD five kilometres radius from Ntaja Health Center together with care givers. Health workers was also included in the study for statistical information about malaria prevalence.

1.8 Ethical consideration

The research got the clearance letter from the university and the research approval committee to go and carry out the research in Ntaja Health center in Machinga District. The permission to carry out the research from Ntaja Health center was asked from the DHO, Machinga district together with the in charge of the health unit. A written consent to carry out research was obtained from the respondent before the questionnaire was administered. In a small meeting with the administration, the researcher explained the objectives of the study. In the course of the study, participants was allowed to ask questions and be assured of the confidentiality. Those participants who had no interest in the study was allowed to withdraw from the study. The questionnaire to be used was confidential and only for academic purposes not any reason.

1.9 Limitations of the study

The study used a lot of time and transport as the all villages who are located at a distance of five kilometres radius from Ntaja Health center was covered during the data collection period, a thing which was not easy. The cost of transport was therefore be high.

2.1 Chapter 2: Literature review

2.1.0 Chapter introduction

This chapter provides the related literature regarding the variables of the study as follows; an overview of Malaria cases in Malawi, theoretical framework, conceptual framework.

2.0.1 Literature review

An overview of malaria cases.

A sizeable portion of the annual death toll from Mosquito-Borne sickness in Africa is caused by malaria. The female anopheles' mosquito, which carries the plasmodium falciparum parasite, bites humans to spread the disease. In 2017, children under the age of 5 made up 61% of all malaria cases recorded globally. Geographically, Africa was home to 92 percent (200 million) of the world's malaria cases, which resulted in 404,550 fatalities.(Malaria Operational Plan FY, 2022).This chapter provides the related literature regarding the variables of the

study as follows. Malaria is one of the top three public health concerns in Malawi. Annually, the illness is discovered in close to 4 million people. Malawi, one of the top 15 nations with a high malaria burden, accounting for 2% of all malaria cases worldwide. (NMCP, 2017). Compared to

other populations in Malawi, children under the age of five and pregnant women are at a higher risk of developing malaria. More than 85% of Malawi's population is the focus of a robust malaria control program that has been in place since 2005. Case management and avoiding mosquito bites from the malaria vector have been the two basic measures.(Services & Islands, 2021). Promoting the use of insecticide-treated nets (ITNs) and indoor insecticide spraying are two prevention strategies. When a child's malaria test is positive, case care procedures include diagnostic testing and the prescription of anti-malarial medications. In order to promote community adoption and utilization, these tactics are used in conjunction with messages about changing social behaviour. (NMCP, 2017).

2.2 Theoretical framework.

This study used the theory from miasma to mosquito-malaria theory.(Lalchhandama, 2014). Miasma theory is the theory which states that diseases are caused by the natural cause while mosquito malaria disease theory is the theory which stated that malaria is transmitted by the mosquito, opposing the Miasma theory.

2.3 Conceptual framework

CARE GIVER FACTORS   HOUSEHOLD FACTORS

- ❖ Age of the care taker
- ❖ Health seeking behavior
- ❖ Knowledge about the disease
- ❖ Care givers educational level
- ❖ Marital status
- ❖ Educational level
- ❖ Occupation
- ❖ Attitude and practices

- ❖ Number of household members
- ❖ Place of residence
- ❖ Level of income
- ❖ Sleeping patterns
- ❖ Use of ITNs

ENVIRONMENTAL FACTOR

- ❖ Drainage system
- ❖ Bushy surroundings
- ❖ Garbage heaps
- ❖ Climate and attitude
- ❖ Place of residence
- ❖ Type of the housed
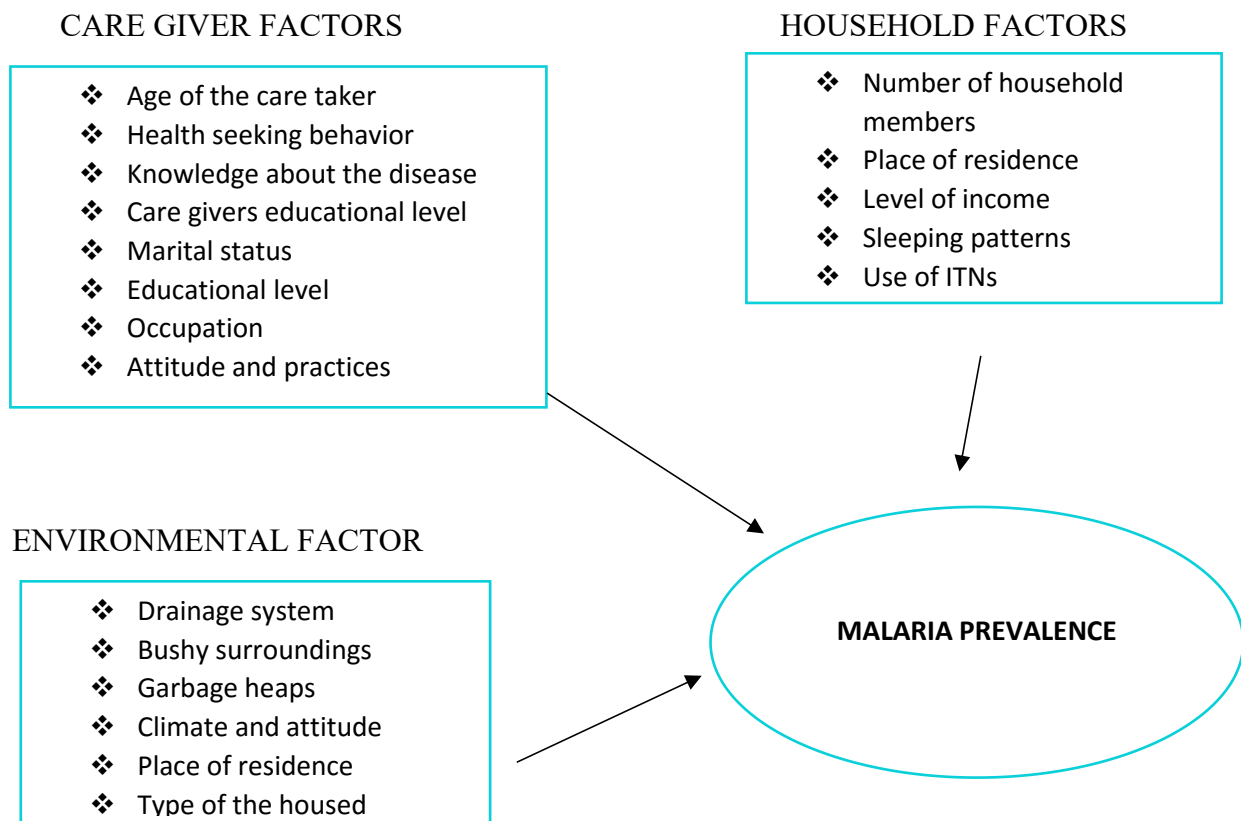
MALARIA PREVALENCE

Figure 1: conceptual frame work

The above frame work shows the relationship between the different variables; the dependent and independent variables. In this case the prevalence of malaria was the dependent variable and the independent variable were care giver factor, household factors and environmental factors. The care giver factors include; care givers age, educational level and knowledge about disease, occupation, attitude on disease prevention. The environmental factors were bushy surrounding, drainage system, garbage heaps, climate and attitude, place of residence and the type of the house. The household factors include place of residence, number of household members, income level, sleeping pattern, type of the house and the use of ITNs.

2.5.0 Chapter 3: Materials and methods

2.5.1 Chapter introduction

This chapter describe the methodology which was used to establish the prevalence of malaria and the associated factors among children below five years who attend OPD five kilometres radius from Ntaja health Center in Machinga district. It includes study area, study population, the study design, study population, sample size determination, eligibility criteria, sampling method, data collection method, data management, data analysis plan, quality assurance and ethical issues.

2.6 Research approach

The study used quantitative approach since it involved the collecting and analysing numerical data, and also to finding out patterns and averages, make predictions, test causal relationships and generalize results to wider populations.

2.7 Research design

The study used a cross-sectional survey design because the design allow data to be collected on prevalence of malaria and the associated factors simultaneously at a particular point in time.

2.8 Study Area

The study setting was at Ntaja Health center, targeting all villages located five kilometres radius from the health center in Machinga District. The health center serves a catchment area of five villages located five kilometres radius from Ntaja health Center namely, Dauda, Kamala, Mtembo, Chiwaya and Chilembwe.

2.9 Sample size determination

The sample size was determined by calculations using the following formula;

$$N = \left\{ Z \times \frac{C}{X} \right\}^2$$

where;

N= Total number of subjects required.

Z= A standardized normal deviate value that correspond to the level of statistical significance equal to 1.64

C= Estimated population which is 50.

X=Margin of error which corresponds to the level of precision's of results desired = 10%

$$N = \left\{ 1.64 \times \frac{50}{10} \right\}^2$$

$$N = \left\{ \frac{82}{10} \right\}^2$$

$$N = 67$$

3.O Eligibility criteria

1) Children under the age of five, who sought treatment at the health unit.
2) Children with suspected signs and symptoms of Malaria
3) Children who came with a fever of 38 degrees and above.
4) Children with no history of anti-malarial drugs in the past 2 weeks.
5) Children whose guardians consented to participate in the study.

3.1 Sampling method

This study employed a consecutively sampling method to enroll all the care givers of children below the age of five years to participate in the study. All the children below five years who comes in OPD were seen by the clinician and those who had the signs and symptoms was sent to the laboratory for testing using MRDT and microscopy. The care givers of these children sent to laboratory were requested to participate in the study and those willing was enrolled to reach the

sample size. Those children who was tested positive/Negative for malaria were used to determine the sample size.

3.2 Data collection methods

3.2.0Source of data

Caretakers of those under five children were the primary source of data in this study

3.2.1 Study tools/instrument

A structured questionnaire was used to collect raw information on social demographic factors, care giver factors e.g. knowledge about the transmission and prevention of malaria, utilization and coverage of insecticide treated nets, environmental factors and household factors. The questionnaire was administered to the eligible participants who are parents or guardians of those under five children and was interviewed. The questionnaire comprised of both open and closed ended questions in English language.

3.2.2Data analysis plan.

This include; descriptive analysis and bi-variate analysis. SPSS 25 software was used to analyse data.

3.2.3Descriptive analysis.

Data concerning categorical variables was summarized and presented in frequency tables. Computing means that standard deviation was used to summarize data of numerical variables.

3.2.4 Bi-variate analysis

The association between proportions of under five children was tested positive and those who were tested negative shall be compared using a chi square. The relationship between independent and dependent variables was analysed using chi square. Independent variables with P-value less than 0.05 was considered to influence the prevalence of malaria among children below the age of five.

3.3 Methodology matrix table

Objective	Variables	Data collection tool	Data analysis
Demographic characteristic of 67 care takers of children aged 5 years at Ntaja health center.	• Gender. • Age. • Marital status • Level of education • location	• Study questionnaire	• Descriptive analysis (frequency and percentage will be employed). **Variable generation and coding** • Codes 1 and 2 will indicate male and female responses respectively. • Codes 1,2,3,4 will indicate age range of 15-24,25-24,35-44 and $\geq$ 45 responses respectively. • Codes 1 and 2 will indicate married and single responses respectively. • Codes 1,2,3 and 4 will indicate Non, primary, secondary and tertiary responses respectively. • Codes Yes and No will indicate near to a swamp and not near to the swamp respectively for house location variable.
To identify care taker factors-part 1 (demographic) influencing the prevalence of Malaria	• Gender • Age, • Marital status. • Education	• Study questionnaire	• Correlate analysis (bi-variate analysis will be deployed in order to find the probability value of the variable.

among 67 children below 5 years at Ntaja H/C	level, location		**Variable generation and coding** Codes 1 and 2 will indicate Yes and No for responses of the following variables respectively; • Ever heard about malaria. • Mode of transmission. • Sleeping under mosquito net. • Wearing of long sleeved clothes. • Spraying with insecticides. • Destroying bleeding places. • Closing windows early. • The use of repellents. • Time of mosquito bite. **Data processing and sustainability.** • Data will be entered into the SPSS program's variables view. • Processing will lead to frequency tables and charts for interpretation. • Field performance will be assessed by assigning scores; ➢ P-value less than 0.05 for significantly related. ➢ P-value more than 0.05 for

			not significantly related. a-for constant variables
To identify care taker factors –part 2,(Knowledge) on transmission and prevention of malaria influencing the prevalence of malaria among 67 children below 5 years at Ntaja H/C	• Ever heard about malaria. • Mode of transmissio n • Sleeping under nets. • Wearing long sleeved clothes, • Destroying bleeding places. • Closing windows early. • Use of repellents, time of mosquito bite	Study questionnaire	• Correlate analysis (bi-variate analysis will be deployed in order to find the probability value of the variable. **Variable generation and coding** Codes 1 and 2 will indicate Yes and No for responses of the following variables respectively; • Ever heard about malaria. • Mode of transmission. • Sleeping under mosquito net. • Wearing of long sleeved clothes. • Spraying with insecticides. • Destroying bleeding places, closing windows early. • The use of repellents and time of mosquito bite. **Data processing and sustainability.**

			• Data will be entered into the SPSS program's variables view.
			
			• Processing will lead to frequency tables and charts for interpretation.
			
			• Field performance will be assessed by assigning scores;
			
			  ➢ P-value less than 0.05 for significantly related.
			
			  ➢ P-value more than 0.05 for not significantly related.
			
			a-for constant variables

To identify caretaker-Part 2 factors(Knowledge) on the signs and symptoms of malaria in children below 5 years at Ntaja H/C	• High temperatures. • Loss of energy. • Vomiting, sweating. • Headache. • Joint pains. • Loss of appetite. • Chills. • Convulsions.	• Study questionnaire	• Correlate analysis (bi-variate analysis will be deployed in order to find the probability value of the variable. **Variable generation and coding** • Variables will be generated based on data characteristics. • Codes 1 and 2 will indicate yes and No responses respectively for the

			following variables; High temperatures, loss of energy, vomiting, sweating, headache, joint pains, loss of appetite, chill and convulsions. **Data processing and sustainability.** • Data will be entered into the SPSS program's variables view. • Processing will lead to frequency tables and charts for interpretation. • Field performance will be assessed by assigning scores; ➢ P-value less than 0.05 for significantly related. ➢ P-value more than 0.05 for not significantly related.
To identify caretaker-part 3 factors(Attitude) influencing the prevalence of malaria among 67 children blow the age of 5.	• I think the best way to prevent myself from malaria is to avoid mosquito bite. • I believe sleeping under	• Study questionnaire	• Correlate analysis (bi-variate analysis will be deployed in order to find the probability value of the variable. **Variable generation and coding** • Variables will be generated based on data characteristics. Codes 1 and 2 will indicate Yes and No responses for the following

	mosquito during night is one way of to prevent malaria. • Am sure that I can treat the child if he/she has malaria. • In my opinion, children and pregnant mothers are at a greater risk of getting malaria. • I think one can recover from malaria without treatment. • I think it's dangerous if malaria medicine is		variables; ➢ I think malaria is a serious and life threatening disease. ➢ The best way to prevent myself from getting malaria is to avoid mosquito bite. ➢ I believe that sleeping under mosquito net is one way of preventing malaria. ➢ Am sure I can treat a child id he/she gets malaria. ➢ In my opinion, children and pregnant mothers are at greater risk of getting malaria. ➢ I think one can recover from malaria without treatment. ➢ I think that it is dangerous if malaria medicine. ➢ I think I should go to the health center to have my child's blood test for malaria. **Data processing and sustainability.** • Data will be entered into the SPSS program's variables view. • Processing will lead to frequency tables and charts for interpretation.

	not completely taken. • I think I should go to the health center to have my child's blood test for Malaria.		• Field performance will be assessed by assigning scores; ➢ P-value less than 0.05 for significantly related. ➢ P-value more than 0.05 for not significantly related.
To identify household factors associated with the prevalence of malaria of malaria among under 5 children	• Type of the house. • Number of people in the house. • Source of right, nature of rooms. • Time to go to bed and the use of mosquito net	• Study questionnaire	• Correlate analysis (bivariate analysis will be deployed in order to find the probability value of the variable. **Variable generation and coding** • Variables will be generated based on data characteristics. • Code 1 and 2 will indicate Yes and No responses respectively for the following variables; ➢ Types of the house. ➢ Number of people in the house ➢ Source of right. ➢ Nature of rooms ➢ Time to go to bed for children

			➢ Use of mosquito net. **Data processing and sustainability.** • Data will be entered into the SPSS program's variables view. • Processing will lead to frequency tables and charts for interpretation. • Field performance will be assessed by assigning scores; ➢ P-value less than 0.05 for significantly related. P-value more than 0.05 for not significantly related.
To assess environmental factors contributing to prevalence of malaria among under five children	• Water drainage. • clear stagnant waters. • Have bushes around the house. • Have garbage heaps	• Study questionnaire	• Correlate analysis (bi-variate analysis will be deployed in order to find the probability value of the variable. **Variable generation and coding** • Variables will be generated based on data characteristics. • Codes 1 and 2 will indicate good and Bad for water drainage variable, and the

	around the house. • Monthly income.		variable of monthly income of $\geq 135{,}000$ and $\leq 135{,}000$ responses respectively. • Yes, and No responses for the following variables; ➤ Clear stagnant waters. ➤ Have bushes around the house. ➤ Have garbage heaps near home. **Data processing and sustainability.** • Data will be entered into the SPSS program's variables view. • Processing will lead to frequency tables and charts for interpretation. • Field performance will be assessed by assigning scores; ➤ P-value less than 0.05 for significantly related. P-value more than 0.05 for not significantly related.

3.4 RESEARCH BUDGET

ITEM (MK)	QUANTITY (MK)	UNIT PRICE (MK)	TOTAL(MK)
Stationery	Several		20,950
Transport	3	5000	15,000
Airtime	3	4000	12,000
Participants incentives	67	2000	134,000
Contingency		100,000	100,000
Grand total			**341,950**

Figure 2: Research Budget.

3.5.0 CHAPTER 4: RESULTS

This study shows the findings of each specific objectives of the study on the prevalence of malaria among children aged below 5 years at Ntaja health center. The objectives include care takers demographic factors, care givers knowledge and attitude, house hold factors and environmental factors on prevalence of malaria.

3.5.1 DEMOGRAPHIC FACTORS

Table 1: Demographic characteristics of 67 caretakers of children aged below 5 years at Ntaja health center.

Gender

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Male	16	23.9	23.9	23.9
	Female	51	76.1	76.1	100.0
	Total	67	100.0	100.0	

Age range

Frequency	Percent	Valid Percent	Cumulative Percent
12	17.9	17.9	17.9
42	62.7	62.7	80.6
9	13.4	13.4	94.0

	Frequency	Percent	Valid Percent	Cumulative Percent
4	6.0	6.0	100.0	
67	100.0	100.0		

Marital status

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Single	16	23.9	23.9	23.9
	Married	51	76.1	76.1	100.0
	Total	67	100.0	100.0	

Marital status

The total number of respondents was 67 and majority 51(76.1%) were females, 42(62.7%) were between the ages of 25-34years, 51(76.1%) were married, most, 35(52.2%), had no level of education and 42(62.7%) stayed close to a swamp as reflected in tables above.

3.6 Malaria prevalence

Figure 1 shows the prevalence of malaria among under 5 children at Ntaja health center

Malaria test results

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Positive	32	47.8	47.8	47.8
	Negative	35	52.2	52.2	100.0
	Total	67	100.0	100.0	

Malaria test results
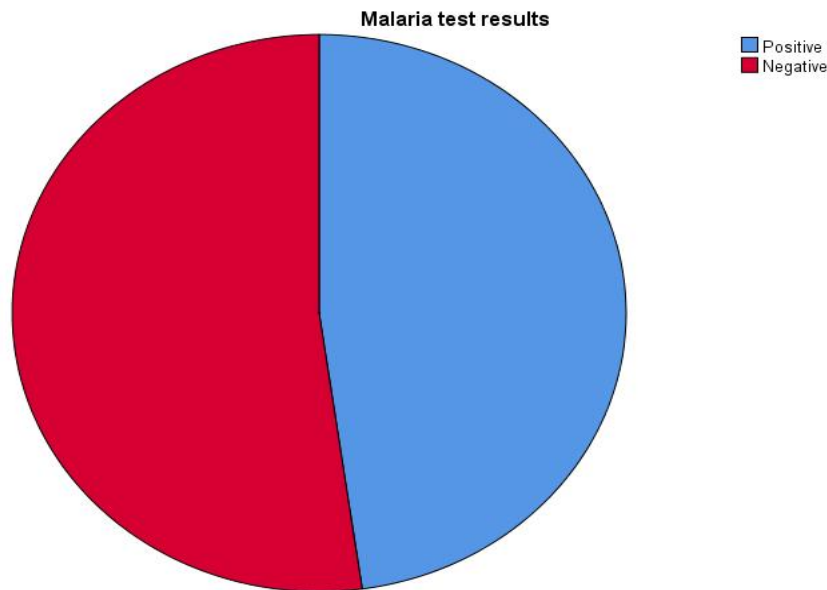
A total of 67 children below age 5 years who attended Ntaja Health Center, coming from different villages, five kilometres radius were subjected to malaria diagnostic tests using MRDT. Of the 67 children, 32(47.8%) tested positive and 35(52.2%) negative as shown in figure above.

Care taker factors: part 1

Table 2**:** Caretaker factors (demographic) influencing prevalence of malaria among 67 children below 5 years at Ntaja Health center.

		Gender	Age	Marital status	Education level	Location	Malaria test
Gender	Pearson Correlation	1	.435**	1.000**	.450**	.432**	.025
	Sig. (2-tailed)		.000	.000	.000	.000	.840
	N	67	67	67	67	67	67
Age	Pearson Correlation	.435**	1	.435**	.707**	.465**	.056
	Sig. (2-tailed)	.000		.000	.000	.000	.652
	N	67	67	67	67	67	67

32

Marital status	Pearson Correlation	1.000**	.435**	1	.450**	.432**	.025
	Sig. (2-tailed)	.000	.000		.000	.000	.840
	N	67	67	67	67	67	67
Education level	Pearson Correlation	.450**	.707**	.450**	1	.194	**.011**
	Sig. (2-tailed)	.000	.000	.000		.115	.928
	N	67	67	67	67	67	67
Location	Pearson Correlation	.432**	.465**	.432**	.194	1	.058
	Sig. (2-tailed)	.000	.000	.000	.115		.641
	N	67	67	67	67	67	67

With care taker factor(demographic) part 1, level of education with a (P-value of 0.01) was significantly associated with prevalence of Malaria in Children below five years. However, other factors ware not significantly associated with malaria prevalence as shown in the table.

Care taker factors: part 2.

Table 3**:** Caretaker factors (Knowledge) on malaria transmission and prevention influencing prevalence of malaria among 67 children below 5 years at Ntaja health center.

		Ever heard about malaria	Mode of transmission	Sleeping under nets	Malaria test results
Ever heard about malaria	**Pearson Correlation**	**1**	**1.000****	**1.000****	**-.018**
	Sig. (2-tailed)		.000	.000	.886
	N	67	67	67	67
Mode of transmission	Pearson Correlation	1.000**	1	1.000**	-.018
	Sig. (2-tailed)	.000		.000	.886
	N	67	67	67	67

Sleeping under nets	Pearson Correlation	1.000**	1.000**	1	-.018
	Sig. (2-tailed)	.000	.000		.886
	N	67	67	67	67
Malaria test results	Pearson Correlation	-.018	-.018	-.018	1
	Sig. (2-tailed)	.886	.886	.886	
	N	67	67	67	67

With care taker factor part 2 (knowledge and prevention of Malaria), hearing of malaria and sleeping under nets with a **P-value of 0.01** was significantly associated with the prevalence of Malaria in Children below five years. However, other factors were not associated as shown in the table.

		Wearing of long sleeved cloths	Spraying with insecticides	Destroying bleeding places	Malaria test results
Wearing of long sleeved cloths	Pearson Correlation	1	.906**	.176	**-.131**
	Sig. (2-tailed)		.000	.154	.290
	N	67	67	67	67
Spraying with insecticides	**Pearson Correlation**	**.906****	1	**.194**	**-.033**
	Sig. (2-tailed)	.000		.115	.790
	N	67	67	67	67
Destroying bleeding places	**Pearson Correlation**	**.176**	**.194**	1	**-.018**
	Sig. (2-tailed)	.154	.115		.886
	N	67	67	67	67
Malaria test results	Pearson Correlation	-.131	-.033	-.018	1
	Sig. (2-tailed)	.290	.790	.886	

	N	67	67	67	67

With care taker factor part 2 (prevention of Malaria), all were significantly associated with the prevalence of Malaria in Children below five years with a **P-value of 0.01.**

		Closing windows early	The use of repellents	Time of Mosquito bite-Day time	Malaria test results
Closing windows early	Pearson Correlation	1	.a	.506**	**-.163**
	Sig. (2-tailed)		.	.000	.188
	N	67	67	67	67
The use of repellents	Pearson Correlation	.a	.a	.a	.a
	Sig. (2-tailed)	.		.	.
	N	67	67	67	67
Time of Mosquito bite-Day time	Pearson Correlation	.506**	.a	1	.184
	Sig. (2-tailed)	.000	.		.135
	N	67	67	67	67
Malaria test results	Pearson Correlation	-.163	.a	.184	1
	Sig. (2-tailed)	.188	.	.135	
	N	67	67	67	67

With care taker factor part 2 (prevention of Malaria), closing windows early was significantly related with the prevalence of Malaria with a **P-value of 0.01.** However, other factors were not associated as shown in the table.

a. Cannot be computed because at least one of the variables is constant.

Care giver factors: Part 2: cont.

Table 4: caretaker factors (knowledge) on signs and symptoms of malaria in children below 5 years at Ntaja Health center.

		High temperatures	Loss of energy	Vomiting	Malaria test results
High temperatures	**Pearson Correlation**	**1**	**.360****	**1.000****	**-.011**
	Sig. (2-tailed)		.003	.000	.928
	N	67	67	67	67
Loss of energy	Pearson Correlation	.360**	1	.360**	.160
	Sig. (2-tailed)	.003		.003	.197
	N	67	67	67	67
Vomiting	**Pearson Correlation**	**1.000****	**.360****	**1**	**-.011**
	Sig. (2-tailed)	.000	.003		.928
	N	67	67	67	67
Malaria test results	Pearson Correlation	-.011	.160	-.011	1
	Sig. (2-tailed)	.928	.197	.928	
	N	67	67	67	67

High temperatures and vomiting were significantly associated with the prevalence of malaria among under five children with a P-value of -0.11. However, others factors were not significantly associated as shown in the table.

		Sweating	Loss of energy	Headache	Joint pains	Malaria test results
Sweating	Pearson Correlation	.a	.a	.a	.a	.a
	Sig. (2-tailed)			.	.	.	.

	N	67	67	67	67	67
Loss of energy	Pearson Correlation	.a	1	.489**	.a	.160
	Sig. (2-tailed)	.		.000	.	.197
	N	67	67	67	67	67
Headache	**Pearson Correlation**	.a	**.489****	1	.a	**-.162**
	Sig. (2-tailed)	.	.000		.	.191
	N	67	67	67	67	67
Joint pains	Pearson Correlation	.a	.a	.a	.a	.a
	Sig. (2-tailed)	.	.	.		.
	N	67	67	67	67	67
Malaria test results	Pearson Correlation	.a	.160	-.162	.a	1
	Sig. (2-tailed)	.	.197	.191	.	
	N	67	67	67	67	67

Headache was is significantly associated with the prevalence of malaria with a P-value of at the 0.01 level. However, other factors were not associated as shown in the table.

a. Cannot be computed because at least one of the variables is constant.

		Loss of appetite	Chills	Convulsions	Malaria test results
Loss of appetite	**Pearson Correlation**	1	**1.000****	**.810****	**-.226**
	Sig. (2-tailed)		.000	.000	.065
	N	67	67	67	67
Chills	**Pearson Correlation**	**1.000****	1	**.810****	**-.226**
	Sig. (2-tailed)	.000		.000	.065
	N	67	67	67	67

Convulsions	Pearson Correlation	.810**	.810**	1	-.183
	Sig. (2-tailed)	.000	.000		.137
	N	67	67	67	67
Malaria test results	Pearson Correlation	-.226	-.226	-.183	1
	Sig. (2-tailed)	.065	.065	.137	
	N	67	67	67	67

Loss of appetite, chills, convulsion were all significantly associated with the prevalence of malaria with a P-value at the 0.01 level as shown in the table.

Care giver factors: part 3.

Table 5: Caretaker factors (attitudes) influencing prevalence of malaria among 67 children below 5 years at Ntaja health center

		Malaria test results	The best way to prevent myself from getting malaria is to avoid mosquito bite	Sleeping under mosquito net during night is one way of preventing malaria	Iam sure that i can treat a child if he/she gets malaria
Malaria test results	Pearson Correlation	1	-.011	-.011	-.160
	Sig. (2-tailed)		.928	.928	.197
	N	67	67	67	67
The best way to prevent myself from getting malaria is to avoid mosquito bite	Pearson Correlation	-.011	1	1.000**	.176
	Sig. (2-tailed)	.928		.000	.154
	N	67	67	67	67

Sleeping under mosquito net during night is one way of preventing malaria	**Pearson Correlation**	**-.011**	**1.000****	**1**	**.176**
	Sig. (2-tailed)	.928	.000		.154
	N	67	67	67	67
Iam sure that I can treat a child if he/she gets malaria	**Pearson Correlation**	**-.160**	**.176**	**.176**	**1**
	Sig. (2-tailed)	.197	.154	.154	
	N	67	67	67	67

All variables here were significantly associated with the prevalence of malaria at the 0.01 level.

		Malaria test results	In my opinion,children and pregnant mothers are at a greater risk of getting malaria	I think one can recover from Malaria without treatment	I think it is dangerous if Malaria medicine is not taken completely
Malaria test results	Pearson Correlation	1	.a	.162	-.162
	Sig. (2-tailed)		.	.191	.191
	N	67	67	67	67
In my opinion,childen and pregnant mothers are at a greater risk of getting malaria	Pearson Correlation	.a	.a	.a	.a
	Sig. (2-tailed)	.		.	.
	N	67	67	67	67

I think one can recover from Malaria without treatment	Pearson Correlation	.162	.ᵃ	1	.117
	Sig. (2-tailed)	.191	.		.347
	N	67	67	67	67
I think it is dangerous if Malaria medicine is not taken completely	**Pearson Correlation**	**-.162**	**.ᵃ**	**.117**	**1**
	Sig. (2-tailed)	.191	.	.347	
	N	67	67	67	67
I think that i should go to the health center to have my child's blood for malaria	**Pearson Correlation**	**-.011**	**.ᵃ**	**.086**	**.738****
	Sig. (2-tailed)	.928	.	.489	.000
	N	67	67	67	67

I think it is dangerous if malaria medicine is not taken completely and one should go to the health here child's Correlation is significant at the 0.01 level

a. Cannot be computed because at least one of the variables is constant.

Table 6: Household factors influencing prevalence of malaria among children below 5 years

		Number of people in the house	Source of light	Time to go to bed for Children	Malaria test
Number of people in the house	Pearson Correlation	1	.454**	.512**	.160
	Sig. (2-tailed)		.000	.000	.197
	N	67	67	67	67
Source of light	**Pearson Correlation**	**.454****	**1**	**.776****	**-.121**
	Sig. (2-tailed)	.000		.000	.330
	N	67	67	67	67

Time to go to bed for Children	**Pearson Correlation**	**.512**[**]	**.776**[**]	**1**	**-.150**
	Sig. (2-tailed)	.000	.000		.224
	N	67	67	67	67
Malaria test	Pearson Correlation	.160	-.121	-.150	1
	Sig. (2-tailed)	.197	.330	.224	
	N	67	67	67	67

Source of light and time to go bed for Children is significantly associated with the prevalence of malaria among under five children at the 0.01 level.

		Time to go to bed for Children	Use of Mosquito net	Malaria test
Time to go to bed for Children	**Pearson Correlation**	**1**	**.571**[**]	**-.150**
	Sig. (2-tailed)		.000	.224
	N	67	67	67
Use of Mosquito net	**Pearson Correlation**	**.571**[**]	**1**	**-.011**
	Sig. (2-tailed)	.000		.928
	N	67	67	67
Malaria test	Pearson Correlation	-.150	-.011	1
	Sig. (2-tailed)	.224	.928	
	N	67	67	67

All variables were significantly related to the prevalence of malaria at the 0.01 level.

Table 7: Environmental factors influencing prevalence of malaria among children below 5years at Ntaja Health center.

		Water drainage	Clear stagnant water	Have bushes around the house	Malaria test
Water drainage	**Pearson Correlation**	**1**	**.327****	**.327****	**.058**
	Sig. (2-tailed)		.007	.007	.641
	N	67	67	67	67
Clear stagnant water	**Pearson Correlation**	**.327****	**1**	**1.000****	**-.011**
	Sig. (2-tailed)	.007		.000	.928
	N	67	67	67	67
Have bushes around the house	**Pearson Correlation**	**.327****	**1.000****	**1**	**-.011**
	Sig. (2-tailed)	.007	.000		.928
	N	67	67	67	67
Malaria test	Pearson Correlation	.058	-.011	-.011	1
	Sig. (2-tailed)	.641	.928	.928	
	N	67	67	67	67

All variables were significantly related to the prevalence of malaria at the 0.01 level.

		Have garbage heaps near home	Monthly income	Type of the house	Malaria test
Have garbage heaps near home	Pearson Correlation	1	.507**	.533**	.614**
	Sig. (2-tailed)		.000	.000	.000
	N	67	67	67	67

Monthly income	Pearson Correlation	.507**	1	.490**	.175
	Sig. (2-tailed)	.000		.000	.156
	N	67	67	67	67
Type of the house	**Pearson Correlation**	**.533****	**.490****	**1**	**-.150**
	Sig. (2-tailed)	.000	.000		.224
	N	67	67	67	67
Malaria test	Pearson Correlation	.614**	.175	-.150	1
	Sig. (2-tailed)	.000	.156	.224	
	N	67	67	67	67

Type of the house were significantly associated with the prevalence of malaria at the 0.01 level, however, other factors were not related to as shown in the table.

3.6.0 CHAPTER FIVE: DISCUSSION OF THE RESULTS.

3.6.1 Introduction

This chapter presents a brief discussion of the study results based on the findings in relation to the specific objectives of the study on the prevalence of malaria and the associated risk factors among children below five years at Ntaja health Center that took place in the months of September, 2023.

3.6.2 Prevalence of malaria among children below the age of five years:

The study findings showed that almost half of the children in this study were found to be sick with the parasite causing malaria which indicated a high prevalence of malaria among children below five years at Ntaja health center which was the study area. This is almost two times higher prevalence compared to the national prevalence of 24% (NMCP, 2017) in the study that was carried out in 2017. The probable reasons for the high prevalence is probably failure to effectively use preventive measures despite the caregivers having good knowledge on prevention and transmission of malaria. Measures like possession of ITNs cannot determine how it is

effectively used to prevent the mosquito bites at night. Also caregivers knowledge about malaria does not determine their effective application of these measures and their attitudes towards their utilization. This may be the other reason for the high prevalence of malaria in the study area. Future studies therefore need to assess the caregivers knowledge on malaria in relation to the utilization of preventive measures as this was not investigated in this study.

Comparing with the sample size and the population in obtaining the data, the prevalence in the study area remained high compared to the national prevalence which is at 24% (NMCP, 2017). Malaria remains the number one killer disease in children below 5 years despite its decrease in prevalence by 19% from 43% in 2010 to 24% in 2017, and this has remained constant since 2017.

The high prevalence of malaria has led to a high public expenditure both in the health system and the individual house holds on procurement of anti-malaria drugs, low productivity where care takers are seen spending a lot of time attending to the sick children, high school drop outs, poverty, retardation among children and the increased morbidity and mortality due to severe anemia, hypoglycemia and cerebral malaria as the common causes of death in children as compared to adults- though this was not investigated but can be proved from other studies or information for example the WHO over view on malaria indicates that children below five years were the most affected with malaria disease and this accounted for 69% of deaths among children in 2015.(NMCP, 2017) .

3.6.3 Caretaker factors influencing the prevalence of malaria:

Considering the findings of the study on the care takers factors, demographic factors (level of education) had statically significant relationship with malaria prevalence among children below age five years while other factors were not. Caretaker's knowledge on malaria prevention; control and transmission were significantly associated with malaria prevalence among these children except mode of transmission. The findings of this study are different from the study that was done in Malawi where MIS indicated an increase in prevalence (P> 0.05) 33% in 2014 in children below 5 years of age despite the caretaker's knowledge on prevention, transmission and control of malaria infection.(Dunca et al., 2007) .Signs and symptoms of malaria were significantly related to high malaria prevalence. The caretaker's attitude towards the prevention of malaria was significantly associated with malaria prevalence according to the study. Caretaker's lack of knowledge on signs like loss of energy and joint pains as signs of malaria can

affect proper diagnosis and treatment seeking for children who might present with no other signs other than these two signs and this can lead to severe disease of complicated malaria increasing on hospital admissions and even mortality rates. There is need for proper and intense health education on the signs and symptoms of malaria so that none of the signs is neglected by the caregivers.

3.6.4 Environmental factors influencing the prevalence of malaria in children below age five years:

Poor drainage system, clear stagnant water and having bushes around the house were significantly associated with the prevalence of malaria among under five children. A lot is needed to be done as this has been proved with other studies as being a breeding site of mosquitoes for example a study that was carried out in Bata district, Equatorial Guinea were care givers (24.77%) responded that bushes around the house was a breeding site for mosquitoes both urban and rural.(Romay-Barja et al., 2016).In a similar study which was done in Bolifamba – Cameroon also proved that bushes around homes among other environmental factors like stagnant waters, swampy/bushy surroundings were highly associated with malaria infection.(Rose, 2018). There is a need to sensitize the community to try and create good drainage system, clear stagnant water and clear bushes around home in order to control the spread and transmission of Malaria. Proper use of preventive measures like sleeping under bed nets is another strategy to avoid mosquito bites to the children.(NMCP, 2017)

3.6.5 Household factors influencing malaria prevalence in children below age five years:

Malaria prevalence in children below age of five years in the study area varied significantly over the different type of sources of light used in the individual households, time to go to bed and the use of mosquito nets as presented earlier in the results. This probably is due to failure of caretakers to utilize the preventive measures available with a miss conception that mosquitoes don't bite when there is light and they do bite only in the dark. Caretakers should be encouraged to use the preventive measures despite the type of source of light they use in their households. They should ensure that the children sleep under the mosquito nets regardless of the available type of source of light in the household.

3.7.0 CHAPTER SIX: CONCLUSIONS AND RECOMMENDATIONS

3.7.1 Conclusions

- The prevalence of malaria among children below age five was very high with as almost half of the sample size of children were tested positive with a proportion (46.3), negative (53.7).
- Level of education was the only demographic factor that significantly influenced the prevalence of malaria among under five children.
- Knowing that malaria causes high temperatures, vomiting, and headache were the only caretaker factors that influenced prevalence of malaria.
- Type of the house, Source of light, time to go to bed and the use of mosquito net was the only household's factors that significantly influenced prevalence of malaria among children below five years.
- Similarly, occurrence of malaria among children below five years was significantly influenced by not clearing stagnant water, poor drainage system, have bushes around the home environment.

3.7.2 Recommendations

The following recommendations can help control high malaria prevalence among children below five years of age attending Ntaja health center.

Re enforcement of communication strategies and information dissemination to change individual and community behaviour and attitudes towards the control and prevention of malaria and insist that they should not only have knowledge of the transmission and control but put in practice or implement the acquired knowledge practically both individually and as a community at large. This should be delivered by well and appropriate trained community health workers, VHTs, health unit staffs in the local languages that are most understood and mainly to vulnerable households.

Efforts should be made for these care takers to know and understand every sign and symptoms of malaria especially those that significantly contributed to the high prevalence of malaria like loss of appetite, headache, chills and convulsions.

Encourage community members with assistance from local HSAs to clear all stagnant waters, bushes around home environment as these are bleeding places for mosquitoes

3.7.3 REFERENCES

Dunca, S., Nimițan, E., Ailiesei, O., & Ștefan, M. (2007). Tehnica examinării caracterelor morfologice și tinctoriale ale bacteriilor. *Microbiologie Aplicată*, 70–76.

Lalchhandama, K. (2014). The making of modern malariology: from miasma to mosquito-malaria theory. *Science Vision*, *14*(1), 2–17. http://www.sciencevision.org/current_issue/dl/Lalchhandama.pdf

Malaria Operational Plan FY. (2022). *President's Malaria Initiative Guinea Malaria Operational Plan FY*. 1–79.

NMCP. (2017). *Malawi Malaria Indicator Survey 2017*. 2.

Romay-Barja, M., Ncogo, P., Nseng, G., Santana-Morales, M. A., Herrador, Z., Berzosa, P., Valladares, B., Riloha, M., & Benito, A. (2016). Caregivers' malaria knowledge, beliefs and attitudes, and related factors in the Bata District, Equatorial Guinea. *PLoS ONE*, *11*(12). https://doi.org/10.1371/journal.pone.0168668

Rose, K. I. (2018). *Malaria Prevalence and Associated Factors Among Children. May*, 1–60.

Services, M., & Islands, S. (2021). *Malaria Prevention and Control Ministry of Health and Medical Services, Solomon Islands Healthy Village Facilitator's Guide. May*.