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SCHOOL OF MEDICINE AND HEALTH SCIENCES

DEPARTMENT OF PUBLIC HEALTH

A STUDY TO DETERMINE THE FACTORS CONTRIBUTING TO THE RISE IN MALARIA PREVALENCE IN MUMBWA DISTRICT OF ZAMBIA

BY

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DECLARATION

Robert Lumai, BSPH1611822

I declare that this dissertation is my creative work and to the best of my acquaintance has not been presented for a degree in any other institution.

Signature: _____ **Date:** **10/10/23**

:

Supervisor Name:

This dissertation has been submitted with my approval as a University of Lusaka (UNILUS) supervisor.

School of Medicine and Health Sciences, Department of Public Health

Signature: **M. MUBANGA** **Date:** **10/10/23**

Acknowledgement

Am grateful to God Almighty for the gift of life and making it possible that I complete this program of public health. I acknowledge the help of my supervisor for the help rendered to see to it that I complete my research.

Without forgetting the other Lecturers, my fellow classmates and family for their support throughout my research.

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ABBREVIATIONS

ANC: Antenatal Care

CDC: Centre for Disease Control

CSO: Central Statistics Office

HIMS: Health Information Management System

IEC: Information Education and Communication

ITNs: Insecticide Treated Bed Nets.

IRS: Indoor Residual Spraying

IPTp: Intermittent Preventive Treatment in Pregnancy

KAP: Knowledge, Attitude and Practices

LLINs: Long Lasting Insecticide Bed-Nets

MACEPA: Malaria Control and Evaluation Partnership

NGO: Non-governmental organization

NMCP: National Malaria Control Program

SSA: Sub-Saharan Africa

SP: Sulfadoxine-Pyrimethemine

UNICEF: United Nations Children Emergency Funds

WHO: World Health Organization

Abstract

Background: Malaria is a common and life-threatening disease caused by a plasmodium parasite, transmitted by the bite of infected mosquitoes in many tropical and subtropical areas. Malaria is caused by the protozoan parasite called Plasmodium. Human malaria is caused by four different species of Plasmodium namely P. falciparum, P. malariae, P. ovale and P. vivax. There are two categories of malaria infections namely uncomplicated and severe or complicated infection. Uncomplicated malaria lasts 6-10 hours and it consists of a cold stage, a hot stage and a sweating stage. This study sought to assess the factors that contribute to the rise in malaria prevalence in Mumbwa District.

Methods: The study used a quantitative research using descriptive cross sectional study on 39 participants.

Results: The respondents were knowledgeable of the importance of using treated bed nets, the time of using it, types of nets and source of information pertaining to LLINs utilization. In this study the utilization of ITNS for respondents has shown that majority of them (74percent) were using bed nets when they went to sleep, while only a few (17percent) who were not using bed nets in regular bases during their sleep. A higher malaria prevalence is associated with a number of factors that lead to lowered malaria transmission, like increased literacy levels, higher access to malaria health awareness campaigns and health education, as well as being able to afford disease prevention methods and treatment. According to the present study, 72.3% of participants had a history of malaria infection however, only 26 were infected with malaria. In particular, individuals who had a family history of malaria were 1.53 times more likely to be infected by *Plasmodium* species compared to their counterparts ($p < 0.001$).

Conclusion: The result showed that malaria is still one of the most serious public burdens in the study area. The main infection factors linked to the infection in the study area were age, sex, marital status, family size, use of LLIN and IRS, presence of mosquito breeding sites, and

openings on their wall/roof. In addition, the main reason for rejecting LLIN is misconceptions about the toxicity of the treated net. The burden of malaria could be reduced by focusing on changing the attitudes towards malaria prevention and control through continued health education.

CHAPTER ONE

1.0 INTRODUCTION

This chapter gives an outline of the background to this study. It begins with an overview of the topic under investigation from a broad perspective and then narrows it down to the Zambian context. Thereafter, the chapter presents the problem under investigation, purpose of the study, objectives and the research questions through which the objectives are addressed.

1.1 BACKGROUND

Malaria is a common and life-threatening disease caused by a plasmodium parasite, transmitted by the bite of infected mosquitoes in many tropical and subtropical areas. Malaria is caused by the protozoan parasite called Plasmodium. Human malaria is caused by four different species of Plasmodium namely P. falciparum, P. malariae, P. ovale and P. vivax. There are two categories of malaria infections namely uncomplicated and severe or complicated infection. Uncomplicated malaria lasts 6-10 hours and it consists of a cold stage, a hot stage and a sweating stage. The patient presents with a combination of the following symptoms: fever, chills, sweat, headache, nausea or vomiting, body aches, and general malaise (Chaponda et al.,,2015).

On the other hand in severe malaria the infection is complicated by serious organ failure or abnormalities in the patient's blood or body metabolism. The manifestation of severe malaria includes cerebral malaria, with abnormal behavioral, impairment of consciousness, seizures, and coma. Complicated malaria also causes severe anemia due to hemolysis.

Hemoglobinuria (hemoglobin in urine). Acute respiratory distress symptom an inflammatory reaction in the lungs may also occur even after the parasite counts have decreased in response to treatment. (Centre for Disease Control Prevention, 2019).

Malaria caused by parasites transmitted to humans by mosquitoes is one of the world's most com mon and serious tropical diseases. Half of the world's population is at risk for malaria, which is e

ndemic (where a constant, measurable number of new cases and natural transmission occurs over time) in more than 100 countries. Children are at particular risk, accounting for most malaria dea ths globally (World malaria report. 2020). Although preventable and treatable, malaria causes sig nificant morbidity and mortality, particularly in resource-poor regions. Sub-Saharan Africa is the hardest hit region in the world, and parts of Asia and Latin America also face significant malaria epidemics. Widespread regional and international efforts to address malaria began in the 1940s a nd 1950s, and strategies have evolved over time. From the early 1950s until 1978, malaria was el iminated in parts of Americas, Europe, and Asia (Centre for Disease Control Prevention, 2019). But such efforts did not reach or workout in many of the hardest hit areas, particularly sub-Saharan Africa. More recent attention to these regions by the United States, other donor governments, multilateral institutions, and affected countries, has helped to increase access to prevention, treatment and reduce cases and deaths. Despite the increase of access to interventions, gaps remain and many challenges have continued to complicate malaria control efforts in hard-hit areas, including poverty, poor sanitation, weak health systems, limited disease surveillance capabilities, drug and insecticide resistance, natural disasters, armed conflict, migration, and climate change (World Health Organization, 2018 Fact sheet).

An estimated one million people in Africa die from malaria each year and most of these are children under 5 years old (World Health Organization. 2020). Malaria affects the lives of almost all people living in Africa. Most people who are at risk of the disease and live in areas where malaria transmission infection is at high frequency, they develop levels of immunity. A smaller proportion of people live in areas where risk of malaria is more seasonal and less predictable, because of either altitude or rainfall patterns. People living in the peripheral areas north or south of the main endemic area or bordering highland areas are vulnerable to highly seasonal transmission and to malaria epidemics. Malaria has been well controlled or eliminated in the five northernmost African countries, Algeria, Egypt, Libyan Arab Jamahiriya, Morocco, and Tunisia. In these countries the disease was caused predominantly by Plasmodium vivax and transmitted by mosquitoes that were much easier to control than those in sub-saharan Africa. Surveillance efforts continue in most of these countries in order to prevent both a reintroduction of malaria parasites to local mosquito populations, and the introduction of other mosquito species that could transmit malaria more efficiently. In the east, malaria is endemic in Madagascar, in the Comoro islands (both the Islamic Federal Republic of the Comoros and the French Territorial Collectivity

of Mayotte), and on Pemba and Zanzibar, but has been eliminated from the island of Reunion. In Mauritius, malaria has been well controlled since the 1950s, but occasional outbreaks of vivax malaria occur, the last in association with a cyclone in 1982. Since 1982 there has been a steady decrease in cases and risk is now extremely low. Seychelles has been free of malaria since 1930, and malaria vectors are believed to be no longer exist there (World Health Organization 2018).

1.2 STATEMENT OF THE PROBLEM

Mumbwa is one of the 12 districts in central province of Zambia. The district has an estimated population of 700237 (Mumbwa District Health Information System 2021). This population is serviced by 35 health facilities categorized as two (2) first level referral hospitals, 22 health Centre's and 11 health posts. Malaria remains the main threat to public health despite decades of control efforts made. It is a devastating disease that threatens productivity and economy of the country. (Mumbwa District Health information system CSO 2020).

The malaria trends in Mumbwa district has been that, in 2018 the incidence was at 7.618/1000 and prevalence rate was 1.26%, in 2019 the incidence was 12.194/1000 and prevalence rate of 1.96% and in 2020 it increased further to 37.693/1000 with prevalence rate of 5.9%. The malaria case fatality rate for all ages was at 11.4/1000 in 2018, 18.3/1000 in 2019 and 56.5/1000 in 2020. (*HMIS 2021 and District Action Plan 2019-2021).*

In response to this challenge, the district has been implementing a series of interventions to reverse the trend. Some of the interventions that the district has been implementing include Indoor Residual Spraying (IRS) of sleeping structures, free mass distribution of Insecticide Treated Nets (ITN) to households under a program known as Community Based Malaria Prevention and Control, treatment of cases and malaria prophylaxis drugs given to pregnant mothers at Antenatal Care Clinics (ANC). These interventions are meant to control and prevent the spread of malaria among the populations in the district. Despite the fact that the district has been implementing all these interventions in an effort to reduce the malaria trends, there is no reduction to that effect. Malaria incidence increases dramatically. This study therefore seeks to determine factors contributing to the rise in malaria prevalence in the district.

1.3 JUSTIFICATION OF THE STUDY

The Ministry of health in Mumbwa has in their district action plan (District Health Information System 2020) requested for a research to determine factors contributing to the rise in Malaria prevalence cases in Mumbwa district despite the application of interventions such as IRS, Treatment of cases, and ITNs provision.

The district conducted a spraying campaign in 2019 and 2020. The spraying season coverage for 2019 was 90% (9250) of the total number of households in the district while in 2020 the coverage was at 75% (1025) of the total households. In 2020 some households where not sprayed but issued mosquito nets hence the drop in the coverage of sprayed houses. Other interventions that were carried out included the distribution of Insecticide Treated Nets in 2020. About 60,000 ITNs were distributed to households (District Action plan 2019-2021). Malaria prevalence rate in Mumbwa District has been that, in 2019 the prevalence rate was 3.4%, 2020 it was 5.5% and in 2021 it increased to 16%.

Though various interventions have been employed to reduce the prevalence of malaria, the prevalence is still high. This study will try to determine factors which have contributed to the rise in malaria.

1.4 RESEARCH OBJECTIVES

1.4.1 GENERAL OBJECTIVES

To identify the factors that contribute to the rise in malaria prevalence in Mumbwa District.

1.4.2 SPECIFIC OBJECTIVES

1. To determine how levels of literacy contribute to high malaria prevalence in Mumbwa District.

2. To determine the knowledge, cultural beliefs and attitude of people that may contribute to the rise in malaria prevalence.

3. To assess the environmental factors, geographical factors and housing characteristics contributing to high prevalence of Malaria.

4. To assess the uptake of prevention strategies.

1.4.3 RESEARCH QUESTIONS

1. Does illiteracy contribute to high prevalence of malaria in Mumbwa District?
2. What are the cultural beliefs and attitudes contributing to high prevalence of malaria in Mumbwa District?
3. What are the environmental, geographical and housing factors that contribute to high prevalence of Malaria?
4. Does inadequate knowledge on malaria prevention and control contribute to high prevalence of malaria in the district?

CHAPTER TWO

LITRATURE REVIEW

2.0 INTRODUCTION

Literature review refers to the actions involved in obtaining a comprehensive summary of previous research on a topic or state of the knowledge about the topic under study. Lawrence A. Machi; Brenda T. McEvoy (2020). It is for this reason that the literature will discuss and review relates to the malaria situation globally, regionally and nationally, the activities that have been implemented in the control of malaria in endemic countries in Africa and the interventions in place nationally. It also reviews the factors relating to success and failures of these interventions globally, regionally and nationally.

2.1 GLOBALLY

In 2020 an estimated of 627,000 people died of malaria (World Health Organization Malaria Report 2021). Most were young children in sub-Saharan Africa. Within the last decade, increasing number of partners and resources has rapidly increased malaria control efforts. This scale-up of interventions has saved millions of lives globally and cut malaria mortality by 44% from 2010 to 2019, leading to hopes and plans for elimination and ultimately eradication. In many of the countries affected by malaria, it is a leading cause of illness and death. In areas with high transmission, the most vulnerable groups are young children, who have not developed immunity to malaria yet and pregnant women, whose immunity has been decreased by pregnancy. The costs of malaria to individuals, families, communities, nations are enormous.

2.2 REGIONAL PERSPECTIVE

Malaria occurs mostly in poor tropical and sub-tropical areas of the world. Africa is the most affected due to a combination of factors:

Efficient mosquito anopheles gambiae which is responsible for high transmission in the sub-Saharan region. The predominant parasite species is plasmodium falciparum, which is the

species that is most likely to cause severe malaria and death. Local weather condition as well often allows transmission to occur year round. Mosquitoes are developing resistance to the major classes of insecticides which have been used to control the disease in the communities. Population and demographic changes have also resulted in more people moving into densely populated areas, thereby increasing transmission. Human environmental changes such as road building, mining, deforestation, and new agricultural and irrigation projects have created new breeding sites. Migration, climatic change and the creation of new habitats have all resulted in people who have no natural immunity to the disease being exposed. This results in much higher rates of disease and death.

Malaria is one of the most severe public health problems worldwide. It is a leading cause of death and diseases in many developing countries. The most vulnerable groups are: young children, who have not yet developed partial immunity to malaria, pregnant women whose immunity is decreased by pregnancy, especially during the first and second pregnancies, travellers or migrants coming from areas with little or no malaria transmission, who lack immunity.

2.3 NATIONAL PERSPECTIVE

Malaria is a major cause of morbidity and mortality in Zambia, particularly in highly endemic areas and among pregnant women and children under 5 years. In 2014, 5.8 million malaria cases were reported through 12 routinely collected data in the National Health Management Information System (HMIS). Reducing the incidence of malaria is a national priority that requires a focused, comprehensive, and consistent approach in order to achieve the vision of “a malaria-free Zambia by 2030”, as stated in the 2011-2016 strategic plan of the Zambian National Malaria Control Programme (NMCP). As part of Zambia’s National Malaria Elimination Strategy, several interventions are implemented to reduce malaria; including universal insecticide treated bed-net (ITN) coverage and Indoor Residual Spraying (IRS) in targeted areas. The plan also includes strategies to: improve malaria case management; improve diagnostic testing capacity and quality, increase coverage of three doses of sulfadoxine - pyrimethamine (SP) for intermittent preventive treatment in pregnancy (IPTp), establish a robust surveillance system, and establish a monitoring and evaluation framework. Malaria research in Zambia has primarily focused on specific interventions and population sub-groups. Phiri 2015 concluded that Indoor

residual spraying was associated with reduced malaria incidence in Kaoma district in areas where it was implemented. According to a study conducted in Macha, Norris 2011 concluded that proper LLIN care was a strong determinant of LLIN efficacy, indicating that education on the importance of LLIN use and care is a key when distributing nets. Others have concentrated on measures such as treatment, insecticide spraying and distribution of mosquito nets to communities.

Zambia reported odds ratio of malaria for various malaria measures. Those who slept under an insecticide treated net (ITN) at 0.90, indoor residual spraying (IRS) at 0.66, urban residence at 0.23 and standard house at 0.40. The country also reported that IRS reduced malaria prevalence by 0.3% and ITNs by 0.2. the national malaria incidence reduced from 386/1000 persons in 2013 to 409/1000 persons in 2014 and 335/1000 persons in 2015, with North-western province recording the highest overall incidence and Luapula province recording the highest incidence rate in pregnant individuals. The 2018 malaria indicator survey reported that 79% of households owned at least one ITN with 45% of those households having all members sleeping under an ITN and a 9% drop in the national malaria parasite prevalence among children under the age of five.

In Zambia the malaria control programs were abandoned because the prevalence levels reduced and on the other hand the treatment and prevention of malaria was costly. A lot of partners and stakeholders have supported malaria control programs in Zambia. The Global funds, United Nations Children's Emergency Fund (UNICEF), President's Emergency Plan for AIDS Relief (PEPFAR), Malaria Control and Evaluation Partnership (MACEPA) and other local stakeholders like Churches Health Association of Zambia (CHAZ) have joined in the fight against malaria.

The National Malaria Control Programme conducted 28 efficacy studies in vivo involving 19 chl oroquine and 9 sulfadoxine pyrimethamine (SP) in 6 sentinel sites based on a 14-day WHO proto col. Parasitic resistance to drugs, vector resistance to insecticides, and movement of people from infected to uninfected and lack of mitigation control programs contributed to the rise of malaria p revalent rates. These studies showed approximately 50% chloroquine treatment failure and 5.5% SP failure. As a result, Zambia revised its national treatment policy for uncomplicated malaria in 2003, changing from chloroquine which had been used since 1960 to an artemisinin combination therapy using artemether lumefantrine as the first line drug, while quinine which has remained ef ficacious served as a second line medicine to treat severe cases. Between 2000-2010, 12 therapeu tic efficacy studies had been conducted; 5 on artemether lumefantrine, 1 on cortesiane, 2 on SP-a

rtesunate and 4 on SP. These studies reported 98%-100% efficacy-adequate clinical and parasitol ogical responses in both 14 and 28-day protocols. Therefore, to effectively tackle parasite resista nce ‘the Government of Zambia introduced coartem as a replacement to chloroquine which was not effective in treating some strains of malaria parasites in 2003 (Chaponda 2009).

2.4 MUMBWA DISTRICT PERSPECTIVE

2.4.1 Households and cultural factor in the utilization of ITNs

Sleeping under a treated mosquito net is one of the major interventions in place to reduce the bites of mosquitoes on human beings thus reducing the transmission of malaria parasites from a susceptible host to another. ITNs have been distributed in Mumbwa district which started from 2013, 2014, 2015, 2017 and 2020. The coverage of ITNs is about 92% (District Action Plan 2020). However, this research seeks to find out the gap between possessions and the use of ITNs. Elsevier B.V. (2021) found out that there were intra-household factors that affected utilization of ITNs in households and these depended on the type of household structure, number of people sleeping in the household, intra-household gender relations, sleeping arrangements, disruption of sleeping patterns due to visitors and cultural rituals and functions. This ensures the research to consider type of household structure, the member of people sleeping in household, sleeping arranging, and disruption of sleeping pattern due to visitors and cultural rituals and functions. I believe these functions affect the consistent in the utilization of ITN. Ascertaining the knowledge on ITNs use will help the researcher to know the community its perception, beliefs and attitude.

2.4.2 Household and cultural factors in Indoor Residual Spraying

Indoor Residual Spraying (IRS) is the application of long lasting chemical insecticides on the walls and ceilings of houses in order to kill the female adult mosquitoes that rest on these surfaces. There are standards that needed to be adhered to by the spray operators for IRS program to be effective in the control of mosquitoes; mosquitoes being the carriers of the malaria parasites.

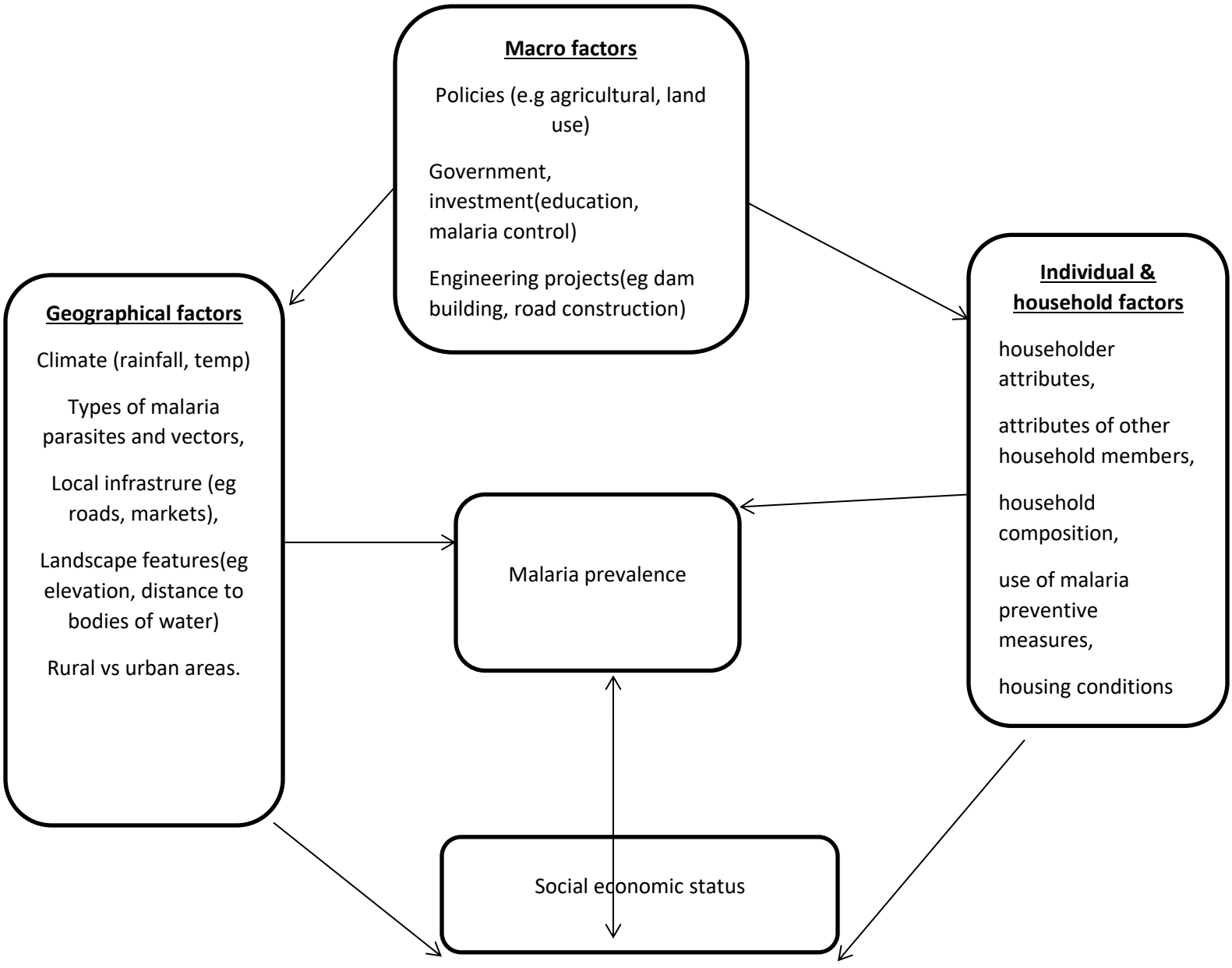
Integrated Vector Management bulletin (2010) indicates that the residual efficacy ranges from

two months to about a year with poor surfaces having the shortest efficacy period. He also noted that Mud, cemented-unpainted, poles, and grass-thatched walls do not maintain the residual effect for long.

2.4.3 Housing characteristics affecting Malaria transmission

According to De Castro (2012) household factors influence malaria transmission and incidence e.g. human migration influences malaria incidence and so are housing characteristics like screening of openings, building materials, and open structural eaves.

2.5 CONCEPTUAL FRAMEWORK OF POSSIBLE FACTORS CONTRIBUTING TO MALARIA PREVALENCE IN MUMBWA DISTRICT



2.6 Conclusion

From the literature review outlined above the interventions should cover almost the entire population for the nation and the district to achieve a reduction in the malaria incidence and prevalence. Another aspect touches on the social economic factors at play in the prevalence of malaria in communities. Human behavior and household characteristics contribute to the prevalence of malaria in a community. Therefore, for a community to achieve a malaria incidence and prevalence reduction the interventions coverage should be above 90% and also that there are massive changes in household characteristics and human behavior.

CHAPTER THREE

METHODOLOGY

3.0 INTRODUCTION

Research methodology is the specific procedures or techniques used to identify, select, process, and analyze information about a topic. In a research paper, the methodology section allows the reader to critically evaluate a study's overall validity and reliability.

3.1 STUDY DESIGN

The study used a quantitative approach with a descriptive cross sectional study design. This is meant to cover the physical characteristics of people and their environments, their knowledge and attitude on malaria interventions. This research will use a mixed approach.

3.2 STUDY SETTINGS

The study was conducted in Mumbwa district which is located in central province of Zambia. Mumbwa is located 260 km from Lusaka in the western direction and is located in the central part of Zambia.

3.3 STUDY TARGET POPULATION

The study targets population comprises of 5500 houses within a two kilometer radius of Munengo area in Mumbwa district. Therefore, 5500 of the population fit in this definition. Hence 5500 populations are the population under study. That population therefore is then to be sampled.

3.4 RESEARCH SUBJECTS AND PARTICIPANTS

The research subjects involved households from the district of Mumbwa who reside in areas where some interventions were implemented and most importantly areas that benefited from Indoor Residual Spraying besides Insecticide Treated bed nets. Household heads were targeted in

this study because the interventions in malaria are targeted at household heads than all the members of the households like children.

3.5 SAMPLE SIZE

Population size	;	5500
Estimated proportion	;	50%
Margin of error	;	5%
Confidence interval	;	95%
Formula	;	N=Z^2 P(1-P)/W*2
	;	= (1.96) *2 X 0.2 (1-0.5)/ (0.05) *2 = 38.416

Since the population is less than 10,000 the required minimum sample will be obtained by;

; 38.416 /1+(38.416)/5500) = 39.423

Therefore, sample size was 39

3.6 SAMPLING PROCEDURE

Purposive sampling to be instituted in the selection of dwelling from 5500 households study population.

The research was conducted in Mumbwa district to determine the factors contributing to high prevalence of malaria in the district. Mumbwa is divided into five geographical zones and from these five communities would be selected for inclusion into the study using cluster sampling method. Households were sampled systematically in the three areas to come up with twenty (20) households from each area in order to make a total of one hundred participants or respondents. Not understanding your sampling.

3.7 DATA COLLECTION TOOL

Data collection tools refer to the devices/instruments used to collect data, such as a paper questionnaire. The researchers ensured that the respondents are made comfortable before commencement of data collection exercise on each day. The tool to be used in data collection is the household questionnaire and interviews. Are you developing one or using an already developed tool? Respondents were given enough time to understand the questions before answering them.

3.8 DATA ANALYSIS

Data Analysis is the process of systematically applying statistical and/or logical techniques to describe and illustrate, condense and recap, and evaluate data. According to Shamoo and Resnik (2003) various analytic procedures "provide a way of drawing inductive inferences from data and distinguishing the signal (the phenomenon of interest) from the noise (statistical fluctuations) present in the data"

All data collected were from a questionnaire and interviews from Munengo area in Mumbwa district. The questionnaires were checked for completeness, legibility, accuracy and consistency to ensure good quality of data. Closed-ended questions were assigned with numerical codes. Coding is done to ensure easy entry and analysis of data using computer software Statistical Package for Social Sciences (SPSS). Open-ended questions were read through, categorized and then assigned to numerical codes. The data was then entered and then analyzed using the Statistical Package for Social Sciences (SPSS). This study utilized both descriptive analytical statistics.

Identification of outliers or unusual entered values were done at the initial stage of the analysis. Data will then be identified and classified accordingly and then monitored and maintained. To test the strength of association between dependent and independent variables.

3.9 VALITITY OF DATA

In quantitative research, validity is the ability of the data collection tool to measure what it intends to measure (Dempsey and Dempsey, 2000). It constitutes external and internal validity. External validity is the extent to which research findings can be generalized to larger or different population settings. A random sampling method was used in order to give each one a chance to

participate. This will be an attempt to determine if the dependent variable were actually influenced by the independent variables. Internal validity is the degree to which the researcher is able to accomplish the study.

As the questionnaire was administered, observations were made to respondents in order to see if they exhibit the variable to be measured. Question was written in simple and clear language.

3.10 DATA RELIABILITY

This is the stability of a measuring instrument over time. The sources of inaccuracy present are deficient in instrument and inconsistence in taking readings from the instruments. The mentioned sources of inaccuracy were overcome by a good understanding of the instruments and how it was used.

3.11 ETHICAL CONSIDERATION

Ethical approval for this study was obtained from the University of Lusaka Research Ethics Committee. Consent will be obtained from every participant spoken with and if for any reason a volunteer is busy at that time of the interview, the researcher then rescheduled the interview date and time. To ensure anonymity of the study participants, the participants in the focus group discussions were given numbers during the sessions by which to identify them. The researcher adhered to principles of autonomy, respect for individual and their right to determine their lives. In a situation that participant declines to give their views or opinions including whatever decision they make, it was respected because they have a right to do so.

CHAPTER FOUR
PRESENTATION OF FINDINGS

4.1 Introduction

This chapter presents the study findings and describes them in sections according to the study objectives. The first section presents the social demographics characteristics of the study respondents, the second section presents how levels of literacy contribute to high malaria prevalence, the third section presents the knowledge, cultural beliefs and attitude of people that may contribute to the rise in malaria prevalence, the fourth section presents the environmental factors, geographical factors and housing characteristics contributing to high prevalence of Malaria and the fourth section presents the uptake of prevention strategies. A total of 39 study respondents were enrolled in the study.

4.2 Demographics Characteristics of the Respondents

Some of the social demographic characteristics of the respondents that were considered in this study included sex, age, marital status, level of education and employment status. In this study 39 respondents were involved. All the 39 questionnaires that were distributed were returned, generating a response rate of 100%. These background variables investigated influence the respondent's knowledge on the utilization of ITNs.

4.2.1 Demographics Characteristics of the Respondents

The majority were the females with 29(60%) and the males were 10(40%). In this particular study, the age group of the participants was categorized into four groups of which those between 20 and below years were 9(23%), those between the age 20-30 were 10 (26%), those between 30-40 were also 10(26%) and those above 40 years of age were 10 (26%). The results here show that out of the total number of respondents, 20 (51%) were noted to be singles whereas a total of 10 (26%) were married at the time of this research. The study also found that a total of 5 (13%) of the community members suffered a divorce at the time of the study and 4(10%) of the community members were widowed. The results show that of the number of respondents, 5 (13%) had no formal education, 10(26%) of the respondents had primary education, 19(49%) had secondary education and 10(26%) attained college and above education. Answers obtained were useful because they helped in determining whether or not level of education had positive and significant effect on waste management. In this particular study, the occupational status

participants were categorized into three of which those who were self- employed were 10(26%), those who were not employed were 20(51%) also and those who were employed were 9(23%).

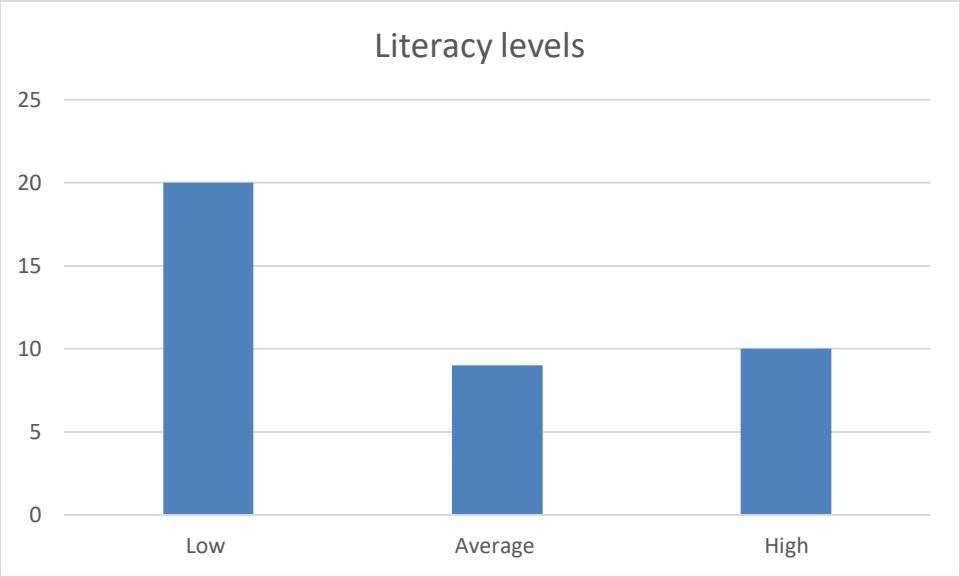
Table: 4.2.1 Demographics Characteristics of the Respondents

Gender	**Frequency**	**Percentage**
Male	**10**	**40**
Female	**29**	**60**
Total	**39**	**100**
Age category		
20 and below years	9	23
20-30	10	26
30-40	10	26
40 and above years	10	26
Total	39	100
Marital status		
Single	**20**	**51**
Married	**10**	**26**
Divorced	**5**	**13**
Widowed	**4**	**100**
Total	**39**	**100**
Educational status		

No formal education	**5**	**13**
Primary	**10**	**26**
Secondary	**19**	**49**
College and above	**10**	**26**
Total	**39**	**100**
Occupational status		
Self employed	**10**	**26**
Not employed	**20**	**51**
Employed	**9**	**23**
Total	**39**	**100**

4.3 How levels of literacy contribute to high malaria prevalence in Mumbwa District.

4.3.1 Figure 1: Literacy Levels



From figure 1 above, those with low literacy levels were 20(51%), those with average levels were 9(23%) and those with high levels were 10(26%).

4.4 Factors Related to Infection

It was found that 30 (77%) of the participants had a history of malaria infection in their households. Although (83.6%) of the participant have access to long-lasting insecticide nets (LLINs), they sleep under the net daily (38%) and during the high transmission season (13%). However, most of the study participants (74%) did not use LLINs for two reasons, fear of toxicity (51%) and misconception (23%) due to the belief that the net did not prevent infection (Table 4.4.1).

Table 4.4.1

Factors that contribute to the transmission of malaria prevalence in Mumbwa District ($n = 39$).

Variables		Frequency	Percent
History of malaria infection	Yes	30	77
	No	9	23
Availability of LLINs	Yes	29	74
	No	10	26
Reason for not using LLINs	Shortage	10	26
	Afraid of toxicity	20	51
	Misconception	9	23
Usage of LLINs	Yes	10	26
	No	29	74
Sleeping under LLINs	Daily	15	38
	Irregularly	10	26
	During malaria season	5	13
	Almost weakly	4	10
	Others specify[a]	5	13
IRS	Yes	10	26
	No	29	74

Variables		Frequency	Percent
Holes *b*/*n* wall and roof of the household	Yes	39	
Availability of mosquito breeding site	Yes	29	74
	No	10	26
Proximity to the breeding sites	<1 km	20	51
	1-2 km	10	26
	>2 km	9	23

4.5 Factors Associated with Malaria

The bivariable and multivariable analyzes revealed that several factors in the research area contribute to malaria infection. Age, marital status, family size, LLIN use, IRS, proximity to mosquito breeding locations, and the presence of holes in wall and roof are all associated factors. Results suggest that malaria infection was significantly associated with marital status and the family size. Those who were married or having a family size of ≥5 were 4.97 (CI 95%: 2.67–9.28) and 2.20 (CI 95%: 1.2–4.06) more likely to be infected with malaria respectively. The result confirmed that usage of LLTN reduces malaria infection. Study participants who did not use LLTN (CI 95%: 0.69–2.83) were 1.4 more likely to be infected with malaria as compared to their counterparts. Furthermore, study participants who refused IRS (CI 95%: 1.21, 5.60) were 2.6 times more likely than their peers to develop malaria infection. The presence of a mosquito-nesting site close to the house and holes between the house wall and the roof had a strong relationship with the occurrence of malaria infection. According to the findings, study participants who had proximity to mosquito location were 3.91 times more likely to contract malaria than their peers CI 95%: 1.87, 5.18). However, the chance of malaria infection was 2.1 higher in the participant who lived in a house with holes between the wall and the roof (CI 95%: 1.13–3.67) as shown in Table 4.5.1

Bivariable and multivariable logistic regression analysis of malaria incidence and associated risk factors in Mumbwa District ($n = 39$).

Variables	Malaria infection		COR (95% CI)			AOR (95% CI)		
	Negative *N* (%)	Positive *N* (%)						
Age								
<20	4 (10)	5 (12)	1			1		
20–30	5 (12)	5 (12)	2.3	1.22	4.29*	2.31	1.15	4.65*
30-40	15(38)	15 (38)	4.15	2.20	7.82**	4.05	1.95	8.42**
Sex								
Male	5 (12)	5 (12)	2.59	1.54	4.35**	3.24	1.75	5.97**
Female	20(51)	9 (23)	1			1		
Marital status								
Married	5 (12)	5 (12)	4.37	2.56	7.42**	4.97	2.67	9.28**
Unmarried	15 (38)	5(12)	1			1		
Family size								
<5	20 (51)	5 (12)	1			1		
≥5	7 (18)	7 (18)	2.53	1.50	4.27	2.20	1.2	4.06*
Usage of LLINs								
Yes	7(18)	3(7)	1			1		
No	20 (51)	9(23)	1.40	0.78	2.52	1.4	0.69	2.83
IRS								
Yes	7 (18)	3 (7)	1			1		
No	20 (51)	9(23)	1.95	1.03	3.70	2.6	1.21	5.60*
Availability of a mosquito breeding site near to household								
Yes	20 (51)	9(23)	2.36	1.27	4.38	3.91	1.87	8.18**
No	5 (12)	5(12)	1			1		
Hole b/n walls and roofs								
Yes	10 (26)	12(31)	2.08	1.27	3.41	2.1	1.13	3.61*
No	12(31)	5(12)	1					

LLINs = long-lasting insecticidal nets, IRS = residual indoor residual spraying and indicate significance level at $p < 0.05$ and $p < 0.001$ respectively.

CHAPTER FIVE

DISCUSSION OF THE RESULTS

5.1 Introduction

This chapter discusses the findings of the study whose main objective was to identify the factors that contribute to the rise in malaria prevalence in Mumbwa District. The discussion is based on the results of interviews conducted during the study and based on four themes, namely; how the levels of literacy contribute to high malaria prevalence in Mumbwa District, the knowledge, cultural beliefs and attitude of people that may contribute to the rise in malaria prevalence, the environmental factors, geographical factors and housing characteristics contributing to high prevalence of Malaria and the uptake of prevention strategies.

5.2 Main discussion

The result showed that malaria is still one of the most serious public burdens in the study area. In addition, it was evident that age of the participants, sex, marital status, family size, utilization of LLINs and IRS, proximity to mosquito breeding site, and presence of holes on the wall were determinants of malaria transmission. This study showed that malaria has got important behavioral related drivers in the disease. A higher malaria prevalence is associated with a number of factors that lead to lowered malaria transmission, like increased literacy levels, higher access to malaria health awareness campaigns and health education, as well as being able to afford disease prevention methods and treatment (Imbahale et al., 2019, Ademowo et al., 2018, Tarimo et al., 2019).. The findings from chapter 4 are consistent with literature review as far as malaria prevalence under five is concerned.

Despite level of education of the respondents, the majority have good knowledge of the use of LLINs in their homes. The respondents were knowledgeable of the importance of using treated bed nets, the time of using it, types of nets and source of information pertaining to LLINs utilization. They mentioned that LLINs strongly prevent them from mosquito’s bites which can lead to malaria illness, most of the respondents explained their concern on proper LLINs

utilization make them live free with malaria without gets recurrent sickness or gets disturbance with mosquitoes when they sleep during night. This was consistent with the study conducted by Rutagwera, (2019) to the women in a household, found that there was significant difference of ITNS utilization between those who had knowledge on the use of ITNS as means for protection against malaria and those who had no knowledge. It was shown that most of those women who know that ITNS protect against malaria they are more likely to sleep under bed nets with their children of under five years compared to those who not know they are less on utilization.

The predominant *Plasmodium* species detected among the participants in the current study participants was *P. vivax.* This is in agreement with previous report from Jimma Town, Aresi Negelle, Hallaba, there exists a the dominance of *P. vivax* over *P. falciparum* in recent years. This could be due to the recurring nature and drug resistance of *P. vivax* against chloroquine.

According to the present study, 72.3% of participants had a history of malaria infection however, only 26 were infected with malaria. In particular, individuals who had a family history of malaria were 1.53 times more likely to be infected by *Plasmodium* species compared to their counterparts ($p < 0.001$). These findings were supported by the Hamusite report, northwest Ethiopia. This might be duto to family members with has a history of malaria infection may become reservoirs of *Plasmodium* parasites.

Different sociodemographic and other factors had been analyzed by taking into consideration of prevalence of malaria infection. Of these factors, the age was one of the significantly associated factors. Here, the odds of having malaria infection were 2.31 and 4.05 more likely among participants in the age group 30-40 years and below 20 compared to others. This aspect of the study is comparable to a previous work conducted in Woreta, Kombolcha, Dembia district and Kola Diba which reported that the prevalence of malaria high in the age group >20 years. (Baljinder,2019).This could be related to their frequent outdoor activities, such as agricultural practices related to irrigation during the peak period of malaria transmission.

The odds of being infected with malaria were 1.4 and 2.6 times higher among participants who did not use LLIN and apply IRS, respectively, and this is consistent with the results of other

studies conducted in Chipata which proved that the use of LLIN and IRS and reduced the transmission. Our results showed that living near to mosquito breeding sites increased the probability of being infected (Chiaya,2019). The study also highlighted that participants who lived near mosquito breeding sites was 1.4 more likely to be infected with malaria compared to their counterparts, who resided away. These findings were consistent with the results of an earlier research report from Arba Minch and Jimma (Chaponda et al.,2019). Less and porous walls and roof of household are significantly associated with malaria infection. The study indicates that participants living with such houses were 2.1 times more likely to be infected with malaria, and this is in line with the results of an earlier research done.

In this study the utilization of ITNS for respondents has shown that majority of them (74percent) were using bed nets when they went to sleep, while only a few (17percent) who were not using bed nets in regular bases during their sleep. This means that there was regular utilization of bed nets in the area of the study although there was minor proportion that were not using especially during the hot season. Also the study found the utilization of ITNS for the children of under-five years was highly marked of (74 percent) and only one percent (1%) did not use ITNs on the previous night of the study. The higher ITNS utilization have been achieved due to the fact that most of household members were able to access freely ITNS distribution to the community through health facilities and by using community leaders and highly knowledge on ITNs utilization and attitude which leads to the community to change of behaviour. It means that most of the under five children were protected with malaria infection by using ITNs strategy.

CHAPTER SIX STUDY

CONCLUSIONS AND RECOMMENDATIONS

6.1 Conclusions of the study

The result showed that malaria is still one of the most serious public burdens in the study area. The main infection factors linked to the infection in the study area were age, sex, marital status, family size, use of LLIN and IRS, presence of mosquito breeding sites, and openings on their wall/roof. In addition, the main reason for rejecting LLIN is misconceptions about the toxicity of the treated net. The burden of malaria could be reduced by focusing on changing the attitudes towards malaria prevention and control through continued health education.

It is important to understand the determinants of malaria so that effective monitoring and evaluation of malaria can be carried out. This study showed the importance of socioeconomic status as well as education in the fight against malaria. In order for malaria to be eliminated in the population it is important for the government to empower the population economically and also ensure that health education is a part of the efforts that are put in place to fight malaria. This will assist in the fight to eliminate malaria. It is important to ensure that resources are channeled in order to optimize prevention strategies that are put in place.

6.2 Recommendations

From this study's findings, the following recommendations could be made;

1. There is need to change the attitudes towards malaria prevention and control through continued health education.

2. There must be targeted interventions in malaria prevention programs and concentrate on areas with high prevalence as this will help to maximise the use of the available resources so that malaria can be effectively eliminated Health education is important in malaria control, therefore health education materials Must be readily available and easily accessible to the targeted

population. This health education can result in behaviour change that results in improved prevention of malaria

3. ITNs are also an important tool in malaria control and must be made available to the population in need.

3. Funding must be made available in order to provide the required ITNs and programs must prioritise their availability and need to have in place a budget to adequately supply ITNs to the population.

5. There must be programs to empower the communities so that they improve their Social-economic and this in turn helps to reduce prevalence of malaria It is important that care-givers especially mothers have access to information on malaria and how to identify signs and symptoms so that suspicious cases can be quickly identified and appropriate action is taken in order for the children to get the treatment that they need

APPENDIX 1.0: WORK PLAN

Task to be done	Weeks	Dates	Responsible person	Days
Submission of research proposal	0	01/04/2022	researcher	1
Clearance from the ethics	3	01/04/2022-21/04/2022	researcher	21
Formulation of data collection tool	1	22/04/2021-29/04/2022	researcher	5
Field testing of the tool	3	25/04/2022-09/05/2022	researcher	21
Data collection	2	10/05/2022-21/05/2022	researcher	14
Data analysis	2	24/05/2022-03/06/2022	researcher	14
Report writing and submission	4	06/06/2022-30/06/2022	researcher	25

GANTT CHART

TASK TO BE PERFORMED	APR, 2022	APR, 2022	APR 2022	APR, 2022	MAY, 2022	MAY, 2022	JUN 2022	JUN, 2022
Submission of research proposal								
Clearance of data collecting tool								
Formulation of data collecting tool								
Field testing of the tool								
Data collection								
Data analysis, management and Report writing.								
Report writing								
Submission of research report.								

APPENDIX 2.0: BUDGET

Item	Unit cost-Kwacha	Total-Kwacha
Lunch allowance for the researchers	K85/day*21*3	K5,355.00
Transport allowance for the researcher	K80/day *21*3	K5,040.00
Typing /editing	K5*80pages	K400.00
Photocopying	K2*80	K160.00
Pens	12*2	K24.00
Pencils/marker	15*6	K90.00
Eraser	1box	K20.00
Ream of paper	65*2	K130.00
Staples/stapler		K70.00
Internet	K400	K400.00
Talk time	K400	K400.00
Flip chart	50*2	k100.00
Binding of report	k60	k60.00
TOTAL AMOUNT		**K12,249.00**

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APPENDIX 3.0
Informed Voluntary Consent Form

The information about this study as contained in the participant information sheet has been explained to me. I was given the opportunity to ask questions about the study which have been adequately answered. I now consent voluntarily to participate in this study and understand that I have the right to withdraw from the study at any time without giving reasons and without any penalties. I understand also that I have the freedom not to answer particular questions that I may deem personal or otherwise during the interview. My signature below signifies that I am willing to participate in this study: I_____ understand the conditions and purpose of this study and I agree to be a participant in this study. Participant' Signature _____ Date_____ Participant's right thumb print (if unable to write): _____ Interviewer' Signature _____ Date_____ Name of witness: _____ Signature of witness:_____ Date: _____ Name of researcher: _____ Signature of researcher:_____ Date: _____ **Title of Project**: A study to determine the factors contributing to the rise in malaria prevalence in mumbwa district of zambia.

Researcher: Robert Lumai

Discomforts/risks: There are no risks or discomforts involved in this study.

Duration of participation: Participation in the study will take about 15 minutes.

Confidentiality: All records are kept confidential and will be available only to professional researchers and staff. If the results of this study are published, the data will be presented in group form and no names will be identified.

Voluntary participation: Your participation is voluntary. At the time of the study, you will once again be reminded of this by the researcher.

Questions or concerns regarding participation in this research should be directed to:

Contact Details of Principal Investigator

Robert Lumai

University of Lusaka

Department of Public Health

Leopards Hill plot No 17986, off Leopards Hill Road

P.O. Box 36711, Lusaka Zambia.

Cell No: +260974141579

Email: lumairobert3@gmail.com

MALARIA HOUSEHOLD QUESTIONAIRE.

Name of household head.....

Household number.....

SECTION A

1. What is your gender?
    a. Male
    b. Female
2. How old are you?
    a. 20-25
    b. 25-30
    c. 30-35
    d. 35 and above
3. What is your marital status?
    a. Single
    b. Married
    c. Divorced
    d. Others

SECTION B

4. Have you participated in environmental sanitation to prevent malaria?
    Yes
    No
5. Is malaria a serious problem in the area?
    Yes
    No

6.Have you ever sprayed insecticide in your room to prevent malaria?

    Yes
    No

7. Do you know when mosquitoes' bites?
    Yes
    No
8. Do you know the resting place of mosquitoes?
    Yes
    No
9. Do you know the breeding place of mosquitoes?

Yes

No

10. Do you have any knowledge about signs and symptoms?

Yes

No

11. Is it possible for someone who is healthy and active with no symptom of malaria to have malaria parasite in their body?

Yes

No

12. Have you ever slept under ITN?

Yes

No

13. Are your home windows covered with nets/wiremesh?

Yes

No

14. Have you ever applied mosquito repellents?

Yes

No

15. Do you think malaria can kill?

Yes

No

16. Do you think malaria can affect everybody?

Yes

No

17. Do you think malaria is preventable?

Yes

No

18. Do you visit health facility when suffering from malaria?

a. Yes
b. No

19. Suggest best ways of preventing malaria in your household and your community……
……
……
……

20. Does illiteracy contribute to high prevalence of malaria in Mumbwa District?
……
……

……

21. What are the cultural beliefs and attitudes contributing to high prevalence of malaria in Mumbwa District?.....

.....

.....

22. What are the environmental, geographical and housing factors that contribute to high prevalence of Malaria?.....

.....

.....

23. Does inadequate knowledge on malaria prevention and control contribute to high prevalence of malaria in the district?.....

.....

.....

- All correspondence should be addressed to:
The District Health Office

Telephone: 260-1-800197
Fax: 260-1-800197

In reply Please quote:
No:

REPUBLIC OF ZAMBIA
MINISTRY OF HEALTH

MUMBWA DISTRICT HEALTH OFFICE
P.O.BOX 830018
MUMBWA

24th June, 2022

The Medical Officer In – Charge
Mumbwa District Hospital
MUMBWA.

Dear Sir/Madam,

REF: RECOMMENDATION TO CONDUCT A RESEARCH STUDY – MR. ROBERT LUMAI.

Reference is made to the above subject matter.

The above mentioned is a student who is doing Public Health at University of Lusaka, School of Medicine and Health Sciences and would like to do his research at Mumbwa District Hospital.

Management has considered Mr. Lumai and has decided to place him at Mumbwa District Hospital for the period of three months.

We sincerely hope that this will be of benefit to Mr. Lumai as an individual and our institution.

Yours faithfully,

REPUBLIC OF ZAMBIA
MINISTRY OF HEALTH
24 JUN 2022
OFFICE OF THE DISTRICT HEALTH DIRECTOR
P.O. BOX 830018,
MUMBWA.

Dr Clementina Phiri
District Health Director
MUMBWA DISTRICT

CC: Mr. Robert Lumai
CC: The Medical Officer In – Charge/ MDH
CC: file

UNIVERSITY OF LUSAKA

SCHOOL OF MEDICINE AND HEALTH SCIENCES
LEOPARDS HILL CAMPUS
Plot No. 37413, Off Alick Nkhata Mass Media. P. O Box 36711, Lusaka.
Phone: +260211258505, 258409 Fax +260211233409; Cell +260976075850,961917862,
E-mail:unilus@zamnet.zm,ictar@zamnet.zm

SCHOOL OF MEDICINE AND HEALTH SCIENCES RESEARCH ETHICS COMMITTEE

Ref no: IORG0010092-2022/194

Date: 29th June, 2022

ROBERT LUMAI– BSPH1611822

Re: Research Title; A STUDY TO DETERMINE THE FACTORS CONTRIBUTING TO THE RISE IN MALARIA PREVALENCE IN MUMBWA DISTRICT OF ZAMBIA

The above research was submitted to the research ethics committee for review. The study has no major ethical problems and is approved subject to the following:

1. The study cannot be changed without express permission of the UNILUS Research ethics committee
2. Approval from the Lusaka District health Management or equivalent health authorities should be sought.
3. The study tools should be added.
4. An informed consent form should be attached and filled by all study participants (If dealing with primary data)
5. The risks and benefits should be included in the consent form.

Congratulations and the committee wishes you success in your work.

CBowa

Prof Kasonde Bowa
MSc(Glasgow),M.Med(UNZA),FRCS(Glasgow),FACS,FCS,DPH(LSTMH),MPH(UCL)
Chairman- UNILUS REC
Professor of Urology and Consultant Urologist
Executive Dean
University of Lusaka and University Teaching Hospital
School of Medicine and Health Sciences.

UNIVERSITY OF LUSAKA

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Phone: +260211258505, 258409 Fax +260211233409; Cell +260976075850,961917862,
E-mail:unilus@zamnet.zm,ictar@zamnet.zm

Date: 29th June, 2022

.....

.....

.....

PERMISSION FOR **ROBERT LUMAI – BSPH1611822** TO CONDUCT A RESEARCH STUDY AT YOUR FACILITY/ INSTITUTION/ ORGANIZATION
Reference is made to the above subject matter

The University of Lusaka, School of Medicine and Health Sciences here by requests for permission for **ROBERT LUMAI** Public Health Student to conduct research at your facility/ institution/ organization, entitled; **A STUDY TO DETERMINE THE FACTORS CONTRIBUTING TO THE RISE IN MALARIA PREVALENCE IN MUMBWA DISTRICT OF ZAMBIA.**

The research is in partial fulfillment of the requirements for the degree of Bachelor of Science Public Health. This is purely for academic purposes and information gained in such a way will not be used in the public domain without prior authorization from the institutions/ organizations involved.

The research topic has been cleared by the University of Lusaka, School of Medicine and Health Sciences Research Ethics Committee as per the attached copy. Data collection is expected to be done from **1st July, 2022 to 1st November, 2022.**

The University of Lusaka avails itself of this opportunity to review to your office the assurances of its highest considerations and looks forward to your timely and favorable response.

Prof Kasonde Bowa
MSc(Glasgow),M.Med(UNZA),FRCS(Glasgow),FACS,FCS,DPH(LSTMH),MPH(UCL)
Chairman- UNILUS REC
Professor of Urology and Consultant Urologist
Executive Dean University of Lusaka and University Teaching Hospital
School of Medicine and Health Sciences.

NATIONAL HEALTH RESEARCH AUTHORITY

Lot No. 18961/M, off Kasama Road, Chalala, P.O. Box 30075, LUSAKA
Tell: +260211 250309 | Email: znhrasec@nhra.org.zm | www.nhra.org.zm

Ref No: NHRA00001/8/04/2023 **Date: 8th April, 2023**

The Principal Investigator,
Robert Lumai
University of Lusaka,
Lusaka, Zambia.

Dear Mr. Lumai,

Re: Request for Ethical Clearance and Authority to Conduct Research

The National Health Research Authority is in receipt of your request for ethical clearance and authority to conduct research titled **"A Study to Determine the Factors Contributing to the Rise in Malaria Prevalence in Mumbwa District of Zambia".**

I wish to inform you that following submission of your request to the Authority, our review of the same and in view of the ethical clearance, this study has been **approved** on condition that:

1. The relevant Provincial and District Medical Officers where the study is being conducted are fully appraised;
2. Progress updates are provided to NHRA bi-annually from the date of commencement of the study;
3. The final study report is cleared by the NHRA before any publication or dissemination within or outside the country;
4. After clearance for publication or dissemination by the NHRA, the final study report is shared with all relevant Provincial and District Directors of Health where the study was being conducted, University leadership, and all key respondents.

Yours faithfully,

NATIONAL HEALTH RESEARCH AUTHORITY

Prof. Godfrey Biemba,
DIRECTOR/CHIEF EXECUTIVE OFFICER