THE IMPACT OF MALARIA CONTROL PROGRAMMES IN SHANTY COMPOUNDS: THE CASE OF ZAMBIA COMPOUND

BY

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DECLARATION

I .....BOLDWIN NJOVU.....hereby declare that this dissertation represents my own work, and that it has not previously been submitted for a degree or other qualification at this or any other University.

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ABSTRACT

According to Africa Malaria Report, 2003, about 90% of all malaria deaths today occur in Africa, South of the Sahara. This is because the majority of infections in Africa are caused by Plasmodium Facciparum (PF), the most dangerous of the four human malaria parasites. It is also because the most effective malaria vector- the anopheles gambiae, is the most widespread in Africa and the most difficult to combat and control. An estimated one million people in Africa die from malaria each year and most of these are children under five years. Therefore, malaria is one of the most serious challenges to modern health care in the world.

Inspite of the existence of the Malaria Control Programmes (MCPs) in Zambia, cases of malaria have continued to rise and occur on a large scale in the country. This clearly puts into question the relevance and effectiveness of the MCPs. This study was intended to answer the question: what has been the impact of MCPs?

The general objective of this case study was to determine the extent of impact to which MCPs in the shanty compounds in Kafue have contributed to the prevention and control of malaria. The study universe was shanty compounds, but Zambia compound in Kafue district was chosen as a sample residential area, where a total of one hundred and eighty-nine (189) respondents were drawn.

Cross tabulations and Chi-square tests were used to verify and examine the effects of different variables on malaria. Among the variables tested were Educational attainment, the use of Malaria Preventive Drugs, Council Residual Spraying and Awareness Campaigns. The tests were done at a coefficient correlation of 5% (0.05). Of the above variables tested, ''Educational attainment" and ''Awareness Campaign'' proved not to affect malaria incidences at least with 95% confidence.

On the other hand, Malaria Preventive Drugs and Council Residual spraying were both proved very effective in reducing malaria cases. The test on consumption of MPDs showed a chi-square value of 0.001, which is far below the coefficient correlation level (0.05) to prove the strong existence of the relationship. Council Residual Spraying equally showed a very small chi-square value of 0.002, leading to conclusions that Residual Spraying influences, to a larger extent, malaria incidence rates. Other than interventions by the council and health institutions, private remedies such as ordinary spray, mosquito coils etc are also used by individual households. Research findings on all private remedies showed their positive effect on reducing malaria incidences.

DEDICATION

I dedicate this report to my wife, Annie, My parents and my four (4) daughters, Priscal, Ketiwe, Takuzwa and, Natasha and, lastly, but not the least, to my grand son, Bruce, for their encouragement and support during my long period of study at UNZA.

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ABBREVIATIONS

ACD	Active Case Detection.
ACT	Artemisin Combination Therapy.
AMCP	Accelerated Malaria Control Programme.
CBoH	Central Board of Health.
CCF	Christian Children's Fund.
CP	Curative Programme.
EDPT	Early Diagnosis and Prompt Treatment.
EM	Environmental Management.
FPS	Family Planning Services.
GIS	Geographical Information System.
HIPC	Highly Indebted Poor Country.
IEC	Information, Education, Communication, Behaviour Change Communication.
IMCI	Integrated Management Childhood Illness.
IRS	Indoor Residual Spray. .
MCP	Malaria Control Programme.
MDG	Millennium Development Goals.
ME	Monitoring and Evaluation.
MoHP	Ministry of Health and population.
MPD	Malaria Preventive Drugs.
MPP	Malaria Preventive Programmes.
MSL	Medical Stores Limited.
NGO	Non Governmental Organisation.
NMCC	National Malaria Control Centre.
PHR	Public Health Reforms.
PRS	Poverty Reduction Strategies.
RBM	Roll Back Malaria.
RH	Reproductive Health.

RIS	Residual Insecticide Spraying.
SPSS	Statistical Package for Social Scientists.
SPSS	Statistical Package for Social Sciences.
TWC	Third World Countries.
USAID	United States Agency for International Development.
WHA	World Health Assembly.
WHO	World Health Organization.

CHAPTER ONE

INTRODUCTION

1.1 Overview

Malaria is one of the most serious challenges to modern health care in the world. Each year, there are hundreds of millions of cases of this disabling disease reported worldwide. Estimates for the mortality from malaria range from 0.5 to 2.5 million, although it is not known the true extent of the disease (*Africa Malaria Report 2003:9).* Global figures indicate that 300 to 500 million people develop malaria and 1.5 to 3 million, mostly children, die annually (*Africa Malaria Report 2003:7).* About 90% of all malaria deaths in the world occur south of Sahara, Zambia included. In all malaria endemic countries in Africa 25 – 40% of (average 30%) of all outpatients clinic visits are for malaria (with most diagnoses made clinically. In these same countries, between 20% and 50% of all hospital admissions are a consequence of malaria an estimated one million people in Africa die from Malaria each year and most of these are children under five (5) years (*Africa Malaria Report, 2003: 14).*

Malaria is a potentially deadly disease that is caused by infection with the parasite of genus *Plasmodium,* which is transmitted to humans through the bite of a female *Anopheles* mosquito infected with the parasite. The most severe form of human malaria infection is caused by *Plasmodium falciparum.* The female Anopheles mosquitoes have shown resistance to numerous insecticides and are widely distributed. It is widely speculated that Africa is the origin of malaria, an Italian word meaning the disease of marshes or swamps *(Malaria and Poverty P16).* The anopheles mosquito which carries the virus that causes malaria is the most widespread in Africa, and the most difficult to control.

The malaria parasites survive by feeding on blood. It is through this process of feeding that the plasmodium is transmitted from one human being to the other. When a mosquito bites someone who is infected, it sucks blood containing the

plasmodium that causes malaria. And when the same mosquito bites another person who is not infected, it injects the malaria parasite into that person. When the plasmodium is injected into the blood stream, it attacks the liver where maturation and multiplication occur. From the liver, the parasites enter the red blood cells. In the cells, the parasites further mature and multiply until the cells burst. During the time the parasites are in the liver, the person may feel fever, nausea and vomiting, headache, abdominal pains and general body pains. Sometimes these parasites can invade organs such as the brain and cause cerebral malaria or the kidneys and cause black water fever. These could be severe forms of malaria and can cause death (Ibid 11).

Malaria is a serious problem in Africa, it afflicts more than one half of the continent's population. The disease kills nearly one million children in Sub Saharan Africa each year, with several million more in their prime working age unable to perform to their potential due to regular bouts of malaria. Around one million children in Africa die every year from malaria and more than 300 million people suffer from mosquito bites each year. Around ten percent (10%) of the total disease burden in Africa is due to malaria. Further, over eighty eight percent (88%) of the World malaria burden falls on African (Ibid 16).

Attempts to control the disease in Africa have, so far, failed. Firstly, there has been lack of information on the magnitude of the economic and social burden of the disease, information that would have motivated policy makers to design and implement more effective control programmes. Secondly, little is known about the economic behaviour of households in seeking treatment or prevention for malaria, thus making it difficult to design appropriate policy incentives for households to effectively allocate resources toward control. Thirdly, in many African countries, there is little knowledge about drug distribution systems in private or public sectors through which anti malaria drugs, as well as other malaria control products and services, are delivered to populations. Consequently, these systems cannot be properly reformed for effective delivery of anti malaria drugs.

Malaria deaths and morbidity in Africa vary greatly from one region to another because of the differences in malaria transmission mechanisms, which include cultural, economic, environmental and political factors. These factors vary substantially, even within townships. Thus, no single factor can be pinpointed as the primary cause of malaria. Consequently, interventions for malaria control should be regionally and contextually specific.

A large scale control of malaria, with the aim of eventual eradication was launched by the World Health Organisation (WHO) in 1955. In 1957, the World Health Assembly (WHA) of WHO established and supported a world-wide malaria eradication programme which lasted until 1969. At the end of the programme, the goal was revised from eradication to control because the eradication goal had proved unfeasible. However, even though the programme did not achieve its intended goal of global eradication of the disease, its direct and indirect effects are credited with the elimination of malaria from Southern United States, Europe, some parts of the Middle East, North Africa and certain areas in Southern America.

According to the journal, *Lacent (April, 23, 2005:19)* in 1998, the World Health Organisation (WHO) identified malaria as a key priority, and announced the launch of the Roll Back Malaria (RBM) campaign, which aimed to bring about a significant reduction in the global malaria burden, with an initial emphasis on the high transmission areas of Africa. The new initiative rose out of a strong and growing political commitment to combat malaria, both in affected countries and the Donor Community. Malaria assumed a high profile globally, regionally and nationally.

The control and eventual eradication of malaria in Africa is a complex problem involving a combination of medical, bio-environmental, economic and other approaches. The problem can start to be addressed in African villages through the

application of biomedical technology and cost effective management of control programmes; mediated by efficient responses to malaria episodes by individuals, households and communities. This integrative approach assigns equal importance to supply and demand side factors in the control of malaria, as well as to institutional arrangements through which Governments, Non Governmental Organisations (NGOs) and Communities would interact in that endeavour.

There is no accurate count of the global toll of illnesses and deaths from malaria. This is due to multiple factors, including weaknesses in data collection and reporting systems, inaccurate diagnosis that may result in over or under reporting and, for many people in malaria endemic areas, and lack of access to skilled workers who can make accurate diagnoses.

At independence, Zambia inherited a Malaria Control Programme that had urban and rural components, though not surprisingly, the control effort was concentrated in urban areas. There were few health facilities, so that access to malaria treatment was poor. After independence, the Government increased its health budget and improved health infrastructure. There was a new emphasis on health for all. Unfortunately, however, a poor national economic climate continues to impact negatively on this progress.

Zambia has one of the highest rates of malaria incidences. The disease kills almost 50,000 people annually. It is the cause of death each year for 40% of children under the age of five. The average household of six persons can expect about 2.4 cases or more of malaria each year (*Episcopal Relief and Development 2004:11).* The Central Board of Health (CBoH) report of May 1997 highlights the fact that the incidence of malaria has increased almost 36% over the last ten (10) years from around 235 to 320 per 1000. This means that there are approximately 3.2 million cases of malaria every year in Zambia. The report further states that the promotive efforts of malaria control are mainly based on dissemination of knowledge through information, education and communication materials. However, promotive efforts

of malaria control have not fully taken off due to lack of human and financial resources.

Malaria continues to be a major public health concern in Zambia. It causes illness in about four (4) million people with an incidence of about 413 cases per 1000 population and 8,000 deaths per year. The focus on malaria prevention and control in the country in the past years has been to rapidly scale up for the impact the coverage of key preventive and treatment interventions. (Bulletins of Health Statistics, Major Health Trends, Ministry of Health, 1976 –1998)

The goals of the Government were to reduce malaria incidence by 75% by the end of 2008 and deaths due to malaria to be significantly reduced by the end of 2011. This would ultimately contribute to the reduction of mortality by 20% in children under five. In addition, the malaria control would improve the main health indicators, as well as provide economic benefits at household and national levels.

It is estimated that malaria is responsible for 45% of hospitalization in Zambia. The most vulnerable groups to malaria still remain the under five (5) children and pregnant women. In these groups of people, malaria is responsible for 50% of under five mortality and 20% maternal mortality. A total of 6,484 deaths due to malaria were recorded in 2006. Table 1.1 shows the trend in Malaria as a proportion of hospital morbidity and death in Zambia. The table shows that there was an increase in the number of admissions for malaria from 1976 to 1994 (Bulletins of Health Statistics, Major Health Trends, Ministry of Health, 1976 –1998).

(Table) 1.1 Malaria morbidity in Zambia, 1976-1994

Year	Total Health Center and Hospital Outpatient Morbidity	Malaria as a Proportion of Total HC and	Total Hospital Admission for Malaria	Malaria as a Proportion of Total Hospital

	for Malaria	Hospital Outpatient		Admissions
1976	590,681	-	36,057	8.8
1977	627,561	-	42,373	10.1
1978	713,739	-	48,418	11.5
1979	761,636	-	46,096	10.9
1980	877,360	-	51,054	11.4
1981	972,285	-	49,374	10.6
1982	1,008,094	-	61,432	12.2
1983	1,287,621	-	81,739	14.4
1984	1,451,396	-	91,848	16.7
1985	1,557,267	10.2	92,641	16.8
1986	1,515,410	10.5	103,238	17.7
1987	1,530,733	-	-	-
1988	2,158,343	-	-	-
1989	1,055,473	8.1	107,270	21.9
1990	1,933,013	16.8	126,912	22
1991	2,153,149	20.6	119,109	20.6
1992	2,957,308	21.0	113,378	19.6
1993	-	-	132,745	-
1994	72,516	-	112,569	-

Source: Bulletins of Health Statistics, Major Health Trends, Ministry of Health, 1976 - 1998

It must be mentioned that these figures are recorded at facility level. The implication of this is that these are rough estimates of the true picture of the malaria situation in Zambia. Some malaria cases are not reported at the facility level. Generally, the incidence of malaria has continued to increase exponentially, and the most affected are children under five years and pregnant women.

Table 1.2 shows the malaria Incidence Rates from 1976 to 1998 as diagnosed by the Public Health.

Table 1.2 Malaria incidence rates from 1976 to 1988 in Zambia

Year	Total Estimated Population	No of New Malaria Cases	Incidence Rate/1000
1976	4,859,860	590,681	122
1977	5,029,955	627,561	125
1978	5,206,003	713,739	137
1979	5,388,213	761,636	141
1980	5,576,801	877,360	157
1981	5,837,317	972,285	167
1982	6,018,274	1,008,094	168
1983	6,204,840	1,287,621	208
1984	6,397,190	1,451,396	227
1985	6,725,300	1,557,267	232
1986	6,967,819	1,515,410	218
1987	7,228,056	1,530,733	212
1988	7,496,997	2,158,343	288
1989	7,565,769	1,993,262	260
1990	7,818,447	1,993,696	247
1991	8,080,682	2,340,994	290
1992	8,352,848	2,953,629	354
1993	8,457,523	3,514,000	416
1994	8,764,180	2,742,188	313
1995	-	-	355
1996	-	-	378
1997	9,640,122	-	383
1998	9,910,035	-	399

Source: Bulletins of Health Statistics, Major Health Trends, Ministry of Health, 1976 - 1998

In response to the malaria burden the Ministry of Health seeks to fight malaria in the National Health Strategic Plan for 2006 – 2010 and the National Development Plan for 2006 – 2010. These Plans envision a "*Malaria free Zambia*" through the use of an integrated approach of all proven malaria control interventions.

The National Malaria Control Programme Committee (NMCP) developed the 2007 Action Plan that was endorsed by the Roll Back Malaria (RBM) partners and the programme has been implementing activities in conformity with the 2007 Action Plan. Malaria control in Zambia is an integrated package of vector control and management, treatment, diagnostics, information, education and communication as well as support for evidence based decision making through operational research and monitoring and evaluation.

The Government hopes to reduce malaria incidence by 75% by the end of 2008 and deaths due to malaria will be significantly reduced by the end of 2011. This would ultimately contribute to the reduction of all-cause mortality by 20% in children under five.

1.2 Anticipated Objectives

The anti-malaria drive had envisaged that by the end of the programme:-

- 80% of pregnant women should have access to three courses of malaria prevention medicine and sleeping under an Insecticides Treated Nets (ITN);
- 80% of population should be sleeping under an ITN.
- 85% of people living in households should have their homes sprayed annually through Indoor Residual House Spray (IRS).
- 80% of malaria patients should be diagnosed and treated within 24 hours of the onset of symptoms.

In an effort to prevent and control malaria, the Government identified four (4) proven cost effective interventions and these were:-

- The use of ITN.
- The spraying of household annually through IRS.
- Case Management (CM)
- Information, Education, Communication (IEC) (Awareness campaigns) behavior change.

1.3 Insecticide Treated Net (ITNs)

The main objective of the ITN work area was to achieve 70% coverage of households by distributing three (3) million nets. It was anticipated that 80% of the population would sleep under an ITN by 2011.

Approximately, 2,986,200 ITNs were planned to be distributed in the country by 2007. Of these, 1,797,000 ITNs would be distributed through mass distribution programme, 585,000 to vulnerable populations through the equity programme, and 489,000 to pregnant women and children under five (5) under the Malaria In Pregnancy (MIP) programme. With strengthened awareness campaigns, the programme was hoped would achieve of 60% ITN utilization.

However, ITN programme encountered the following constraints:-

- High distribution costs for ITNs, as the districts had to use hired private transport. Most district councils did not have transport and, as a result, they had to rely on hired transport which proved costly.
- Delays in the delivery of re-treatment kits. Once the kit was delivered, there was a delay in bringing in the re-treatment kits.
- Lack of funds to carry out the ITN programme. Generally there were no funds to implement the programme.
- Poor co-ordination with parallel programmes by some NGOs. Some NGOs were running similar programmes and therefore it was prudent to co-ordinate their programmes with those of the Government. What was

obtaining on the ground was that the two (2) programmes were poorly co-coordinated.

- Accessories to hang ITNs not easily accessible to communities affecting use. Most ITNs were bought without accessories, making it difficult for the people to use. It was also compounded by the fact that these accessories were not easily accessible.

1.4 Indoor Residual Spray (IRS)

IRS is an effective vector control intervention which offers community protection. Government's IRS objective was to increase the coverage among eligible populations from 70% to 85% (approximately 700,000 structures by 2008 and maintained to 2010).

Residual spraying of household is effective only if it is done frequently and thoroughly. If it is done once in a while, and covers only some structures, it is not effective and is a waste of district funds. However, due to economic constraints, thorough spraying is not possible in most districts in Zambia.

The following are some of the challenges faced by the IRS programme:-

- Lack of funds to do thorough spraying of the households.
- Inadequate transport to carry the equipment and the workers.
- Delayed refurbishment of storage facilities in the districts.
- Delayed procurement of spray pumps and chemicals.

1.5 Case Management (CM)

According to the National Malaria Control Centre (NMCC) Report: 2007, the main objective of CM is to ensure that at least 80% of patients with malaria are appropriately diagnosed and managed within 24 hours by 2008. Zambia changed its malaria treatment policy in 2003 to Artemisin Combination Therapy (ACT); the drug of choice being Coartem, as the first line drug, that was distributed out to all public health institutions (Hospitals, Clinics etc).

This was in response to the increasing parasite resistance to a drug commonly used, Chloroquine, the then first line anti-malaria drug. The Government also introduced use of malaria rapid diagnostic tests, as well as training microscopists in trying to increase the malaria case detection capacity. The home management of malaria strategy was being explored for roll out in phases in a bid to increase the malaria cases being diagnosed and treated promptly and correctly. However, among others, the following are the challenges faced in the implementation of CM:-

- differential pricing of the drug, Coartem, between the public and private sector led to leakage from the public sector to the private sector, as well as restricting access to an effective anti malarial programme by significant proportion of people.
- Access to effective treatment within 24 hours was still restricted due to low health facility coverage of the population.
- Problems of supply, distribution, and record keeping, and lack of appropriate storage facilities persist in health facilities.
- Providers have limited capacity to manage complicated malaria in pregnancy.
- Health workers' compliance with the new anti malarial drug policy is limited, as patients' adhere to the treatment.
- The untimely availability of funds.

1.6 Information, Education, Communication, Behaviour Change Communication (IEC)

Government's goal is to reduce the burden of malaria mobility and mortality in communities through behaviour change communication. Communication is an integral and important component in the prevention and control of malaria communication and provision of preventive commodities and services cannot be

divorced, as one requires the other in order to achieve successful implementation of interventions. Services may be made available but if the communities do not understand the benefits of the interventions, the desired impact will not be achieved.

Communication is an important process of informing and persuading communities to adopt positive, behavioural traits to take preventive measures, recognize signs and symptoms of malaria and seek early and appropriate treatment. It is essential for society to generate political will and resources to tackle the debilitating effects of malaria.

Communication that addresses specific behaviours is cardinal. The rapid scale up of malaria control in Zambia will prove successful if communities accept and use preventive and treatment measures made available to them by both Governmental and Non Governmental Organisations. Among constraints faced by IEC are:-

- Lack of delivery mechanisms for interpersonal communication at the community and household level.
- Little time availed to health facility workers to do IEC work.
- Lack of funds to implement the IEC programmes.

Many measures to control the emergence and spread of the disease had been put in place. But their positive effect appeared to be negligible. This study intended to investigate the impact these measures have had so far in Zambia and what the way forward should be in order to improve the health status of the nation. The study covered the period from 2000 to 2006.

1.7 Statement of the Problem

The problem is that despite the introduction of the Malaria Control Programmes (MCPs) in Zambia, available information shows a continued rise in incidence rate.

Records from the Ministry of Health and other relevant authorities carry latest information portraying a worsening malaria situation. For example, reports on malaria cases indicate the following:

Malaria incidence rates have nearly tripled over the past 23 years, from 1976 to 1999. In 1976 the incidence rate for malaria was reported to be 121.5 cases per 1000 population, a rate equal to a little more than one case of malaria for every eight (8) persons. By 1999, the incidence rate for malaria had risen to 308.4 per 1000 population, a rate equal to one case for every three (3) persons. If under reporting was taken into account, there are probably many more cases of malaria occurring in Zambia than those noted above (National Malaria Situation Analysis Zambia; 2000: NMCC).

In 1976, 10.6 deaths were reported for every 1000 malaria cases admitted to health centres and hospitals. This is a rate equal to one death for every hundred (100) persons admitted for malaria. Twelve (12) years later, in 1994, the malaria case fatality had risen five fold to 51.3 deaths per 1000 malaria cases admitted to hospital. This rate is equal to one death for every twenty (20) persons admitted for malaria (Central Board of Health Report: 2000);

The preceding alarming data about the malaria situation in the country prompted the study to ask the question: what control measures have been put in place against Malaria, and what impact has this had on the health status of the people in Zambia Compound, Kafue district?

1.8 Objectives of the Study

1.8.1 *General Objective*

The general objective of this case study was to determine the extent to which MCPs in the shanty compounds in Kafue have contributed to the prevention and control of malaria.

1.8.2 *Specific Objectives*

i. To investigate measures or specific strategies put in place by those executing MCPs in the shanty compounds in Kafue.

ii. To determine the effect which the adopted measures have had in the control of malaria.

1.9 Rationale

The rationale of this study was to add to the existing knowledge about the impact the malaria control measures have had in eradicating the disease in shanty compounds. The literature will also serve as reference material for future students interested in malaria control remedies. Its recommendations will provide further policy alternatives the state might wish to adopt for the future endeavour against malaria.

1.10 Theoretical Framework

1.10.1 *The Systems Theory*

An evaluation of the Impact of the Malaria Control Programmes can best be undertaken with assumptions based on Ludwig Von Beterlanffy (1901-1972)'s General Systems Theory. Beterlanffy (1968), in his *General Systems Theory,* defines a system as "a set of elements standing in interrelation among themselves and with the environment". In the systems theory, progress is only possible by passing from a state of undifferentiated wholeness to a differentiation of parts, meaning that the best way to understand the whole is by understanding its formative parts. All parts of the whole interact in an exchange process to influence

the performance of each other. Any disturbance in one part of the system will disturb the functioning of the rest of the other components of the system, and interrupt the organizational processes. For example, the shortage of malaria drugs and other resources will affect the output of the Malaria Control Programmes. Similarly, the lack of a malaria policy by a country will affect the implementation of the Malaria Control Programmes. It can also be argued that in cases where the players in the Malaria Control Programmes are poorly linked, the programmes are not likely to produce the desired outputs.

Beterlanffy's inclusion of the term environment in his definition of a system, underlines his belief that a social system is an open system. All open systems interact with the environment in the sense that they obtain demands from the environment and supply their final outputs to the environment.

The Malaria Control Programmes can be viewed as social systems because they have a set of elements that stand in interrelationship among themselves and with the environment. The organization obtains inputs from the external environment in terms of human, material and financial resources, and demands in the form of goods and services. The inputs are aggregated into goods and services that are supplied to the external environment as outputs to meet its demands. Once the outputs have been supplied to the external environment, there will be need for feedback aimed at evaluating the extent to which the organization was effective in the processing of the various inputs into outputs. Feedback also helps the organization in assessing the extent to which it was effective in the delivery of the final product or service to the elements in the external environment such as clients, regulators, government among others.

These elements include the organizational apparatuses through which the Malaria Control Programmes are framed and implemented. The environment constitutes the individuals, communities, government, donors and the other stakeholders who make certain demands in the malaria control process. A key element of the

environment is the community which happens to be the major beneficiary of the Malaria Control Programmes.

Just as the interactive processes occur in Beterlanffy's General Systems Theory, the Malaria Control Programmes obtain inputs from the environment in terms of healthcare professionals, malaria drugs, mosquito nets and funds from the government and donors. These inputs are aggregated into certain outcomes that are supplied back into the environment. The outcomes constitute the desired outputs of the Malaria Control Programmes, as well as the impacts. The impacts are the effects of the Malaria Control Programmes which may or may not be of benefit to the community.

1.10.2 *Definition of Concepts*

In this study, the key terms have been understood in the contexts explained below:

(i) *Anopheles* refers to a female mosquito which carries the parasite causing malaria.

(ii) *Artemisin Combination Therapy* refers to the combination of various malarial drugs which make a malaria drug known as Coartem.

(iii) *Chemoprophylaxis* refers to a special treatment given to high risk groups (Pregnant women, Sicklers, Children, etc).

(iv) *Chloroquine* refers to the first line antimalarial drug in Zambia.

(v) *Coartem* refers to a drug which is a combination of Artemether and Lumefantrin, currently being used to cure malaria in Zambia.

(vi) *Epidemiology* refers to the study of the way diseases spread and how to control them.

(vii) *Malaria Control* refers to measures put in place to eradicate the malaria disease.

(viii) *Shanty compounds* (used interchangeably with squatter compounds) refer to ungraded areas occupied by people usually illegally.

(ix) *Plasmodium falciparum (p. falciparum)* refers to the most dangerous of the malaria parasites.

(x) *Sulfadioxine pyramethamine (commonly known as fansidar)* refers to the second line antimalarial drug in Zambia.

1.11 Literature Review.

Although there are many researches that have been conducted on the impact of the Malaria Control Programmes, much of the available information does not indicate the exact impact of such programmes on community malaria control. Also much of the available information is not on Zambia, and the performance of Malaria Control Programmes is affected by certain social, economic and political environments prevailing in these countries.

According to the *World Bank Technical Paper Number 183* (2004), African Savannah represents the highest malaria endemic area in the world. The factors responsible for high levels of continuous transmission include propitious climatic conditions for vector breeding and the presence of highly efficient vectors. This pattern is characterized by the high frequency of illness among young children and pregnant women. In Africa, there are 80% of clinical cases and 90% of the parasite carriers. There are about 300 million cases of malaria per year. The paper points out that the most important aspect of malaria control was to reduce the impact of the disease by providing effective treatment to all people suffering from malaria, which would require extension services and health education. The paper also highlights the fact that at the beginning of the malaria eradication programme, a major effort was made to train the personnel needed for the programme. However, as programmes became staffed and because malaria was expected to disappear quickly, man power resources, especially young professionals and technical staff, became increasingly scarce. Moreover, training for eradication was definitely oriented towards the execution of the highly standardized programme tasks and operations. To meet current needs and achieve sustainable control, human capacity building is essential in order to reorient human resources not only to apply standard solutions to current problems, but also to identify and find solutions to future problems.

This piece of literature was helpful to the researcher because it provided an insight into how the scarcity of trained manpower negatively affected implementation of MPCs.

Largely, the paper concentrates on government effort on treatment and health education. It does not clearly spell out the effects of those measures in controlling malaria which is the intended focus of this study. Accordingly, the research was not conducted in Zambia to provide a comparative analysis.

According to C. Baume (Comparing Care Seeking for Childhood Malaria 2002:9) observes that malaria caused illness and death all over the world until just half a century ago. Although the disease has been eradicated in the industrialized countries of the Northern Hemisphere, it still threatens 40% of the World's people, mostly those living in the poorest countries. At least 300 to 500 million people become acutely ill with malaria each year and more than a million die from the infection. Over 80% of malaria deaths occur in Africa, South of the Sahara, and most of those deaths affect infants or very young children. Everyday 3,000 children die from malaria. If children survive the disease, they may suffer from brain damage or paralysis. Baume's report does not cover the impact of measures taken to combat malaria. Overall, the writer puts emphasis on the high mortality rate of children dying as a result of the disease without due consideration of the general populace.

Stephen. A. Vost, in the journal, Malaria *Among Gold Miners in Southern Para, Brazil, Vol.30, No 10*, (1990), notes that malaria grew more prevalently in the Amazon frontier (particularly among gold miners in Brazil), despite increased expenditures by disease control authorities. National and regional tropical disease control strategies were, as a result, being called into question. The current crisis involving traditional control eradication methods has broadened the search for feasible and effective malaria control strategies- a search that necessarily includes an investigation of the roles of a series of individual and community level social

economic characteristics in determining Malaria prevalence rates, and the proper methods of estimating these links. Waves of migration into the delicate ecosystems of the Amazon jungle by gold miners triggered alarming increases in malaria. These dramatic increases provoked renewed interest in the individual and environmental factors that influenced malaria's transmission, with an eye towards re-evaluating the control/eradication methods currently employed.

Stephen Vosti made an attempt to investigate a series of complex interrelationships that link social-economic factors to the prevalence and spread of malaria at the individual and household levels. The researcher hoped that by identifying the relevant and potentially manipulateable links, disease control could be made more flexible. Renewed interest in malaria control has produced a polarization among malaria researchers regarding the limitations of different types of field data in addressing the relevant disease transmission and control issues, especially quantifying the disease.

Stephen Vosti identified wide interpersonal differentials in malaria prevalence rates, and firmly linked these differentials to a series of social economic and environmental factors. This researcher agrees with the view that there is need to emphasise the importance of a flexible set of disease control measures that can be altered to fit the socio economic and ecological realities of specific endemic areas, as well as react to changes in the disease environments and other circumstances. The living conditions among Gold Miners in Southern Para, Brazil are similar to those found in Africa, particularly in Zambia i.e. poor housing, poor drainage, lack of medical facilities etc. Vosti's study emphasises more on the curative measures of combating malaria as opposed to the impact of these programmes. Findings by Stephen Vosti are relevant to this study in the sense that they provide an insight on factors that are likely to affect effective control of malaria in Zambia. This is because both Brazil and Zambia are Third World Countries (TWCs) with similar political, economic, social and administrative difficulties. However, despite the two being TWCs, there could be some slight variations in certain sectors because

Brazil is in South America and Zambia in Africa. The actual levels of development and accessibility to resources could be different between the two countries. Therefore, this study will establish whether the impact of Malaria Control Programmes (MCPs) in Brazil is the same as in Zambia.

According to Pedro Alonso, "Malaria: The Impact of Treated Bed Nets on Childhood Mortality in Gambia."(1992:2), malaria remains one of the most critical causes of death in children under five (5). The study conducted showed that general and specific malaria mortality in children under five had sharply reduced by the introduction of ITNs. The study emphasised the importance of the use of ITNs for preventive control of malaria. The data shows that in the study areas, the probability of death among the 1-4 years olds fell by 29% from 1989-1990.
Current targeting of ITN programmes tends to be roughly associated with the higher income-middle income bracket to be reached through the commercial sector and social marketing. The lower middle-average rural population is reached through Non Governmental Organisations (NGOs) and donor supported efforts through the district. The poorest population is targeted by the public sector. However, in his study, Pedro Alonso ignores the fact that malaria control cannot be restricted to ITNs alone as there are several other strategies. Zambia has several MCPs whose impact may not necessarily be similar to the ITNs.

Catherine Goodman, in her submission about "Economic Analysis of Malaria Control in Sub-Sahara Africa (SSA),"(2000), which includes Zambia, argues that appropriate and timely malaria case management should be seen as not only a key component of any Malaria Control Programme, but also a fundamental right of all populations affected by malaria. However, in reality malaria case management is often highly inadequate for the following reasons:

i. Inappropriate drugs are prescribed ;
ii. Compliance with the recommended regime is low;
iii. Drugs are often ineffective due to resistance or poor quality; and

iv. Patients with severe malaria are managed inappropriately.

Inadequate care results in higher morbidity and mortality from malaria, and may also encourage the development of drug resistance.

Catherine Goodman, like others, proposed several interventions without assessing impact of combating malaria. The proposed interventions were:

i. Using more effective drugs; improving the availability of second and third line drugs by changing the first line drug for treatment.
ii. Improving compliance; through pre-packing and training.
iii. Using combination therapies; this will reduce the growth of resistance.
iv. Strengthening diagnosis; the introduction of new diagnostic techniques.

Other strategies to improve the case management of malaria include the introduction of the Integrated Management of Childhood Illness (IMCI), and improving the quality of drugs. IMCI is currently being piloted in some African countries, which aim to improve the treatment of the most common childhood diseases and conditions (acute respiratory infections, measles, malaria, diarrhoea and malnutrition). Due to the considerable overlap in the signs and symptoms of these diseases, a single diagnosis for a sick child is often inappropriate, and may lead to other serious and potentially life threatening conditions being over looked. Drug quality is a major problem in some countries. The implications of increasing drug quality, while recognised to be potentially important, are very difficult to assess due to lack of available information on the proportion of drugs that are currently sub-standard. Furthermore, the interventions proposed are expensive to implement.

The study endeavoured to examine the impact of interventions proposed by Goodman in her work / literature. The proposed interventions are expensive to be implemented. This study concurs with the writer's view that appropriate and timely

malaria case management should be seen not only as a key component of any MCP, but as a necessity.

Jose A. Najera in his submission, "New Patterns and Perspectives"(1991), states that most available anti-malaria interventions are far from ideal, not only in effectiveness but in their suitability for incorporation in into long term policies or the everyday practices of people and communities. He further states that many of the interventions against malaria have lost much of their original effectiveness because resistant strains of parasites or anopheles have developed.

According to Najera, there was need to understand the epidemiology of malaria and problems of parasites and vector resistance. The tools of epidemiological investigations should be improved in order to identify problems concerning malaria, plan and evaluate potential solutions. He also pointed out that there is need to understand and monitor social and economic processes that may influence the epidemiology of malaria and facilitate or hamper the effectiveness of potential control measures.

Najera observes that funding for MCPs shrank when people began to recognise that malaria could not be eradicated, and that was due to failure of models developed for incorporating malaria control into the primary health care strategy.

According to Najera, the most damaging effect of malaria eradication for years was the neglect of malaria research. And that throughout the world, support for further research contracted swiftly. He points out that the reawakening of interest in malaria research has shown a market bias towards new technological development through laboratory based research, mostly in chemotherapy, immunology, genetics and the genetic control of vectors.

Najera's study was useful to this research in that it highlighted most problems faced in the control of malaria. It also brought to surface how malaria, as a disease was perceived at the time of the study.

The Malawian government has put in place a Malaria Policy (Malaria Policy 2002). This policy is based on an in-depth analysis of malaria and its control in Malawi. It was to be adopted throughout the country and was aimed at serving two purposes: The first was to guide the Government, Multilateral Agencies, Bilateral Agencies, NGOs, Research Institutions, Civil Society, The Private Sector, Service Providers and Communities, as a basis for decisions and actions for shared protocol and consistency approach. The second was to provide broad priorities and criteria for malaria interventions in the health sector and other sectors in Malawi.

In Malawi, the absence of a policy to guide activities, efforts and resources by the Ministry of Health and Population (MoHP) and other Partners nationwide, led to the MCPs being uncoordinated and incomplete. The Malaria Policy covers main areas of malaria control and prevention, namely effective case management, especially in children under five (5) years of age, use of ITNs and other vector control measures as well as operational research and information, education and communication. The policy also addressed crosscutting issues such as management, financing and human resources. In Malawi, where the government has a malaria policy, MCPs have yielded positive results. This literature provides useful information on how MCPs have worked in a similar way in Zambia. However, since Zambia has no malaria policy, this research would help to show whether or not having a malaria policy in place can help MCPs achieve their intended goals. Records at the National Malaria Control Centre (NMCC) in Lusaka, an organisation dealing in MCPs in Zambia, indicate that Zambia has no policy regarding the MCPs. The country relies on guidelines in stipulated Public Health Reforms (PHR) in implementing the MCPs.

N. Sipilanyambe in the report "Evaluation of the Social Economic Factors Associated with Malaria" (April, 20050 states that there was a correlation between the illness particularly in the community and social economic factors. The report states that the proportion of malaria prevalence decreases with increasing age. It is

higher in under five (5) children than in persons who are five (5) years and above, which correlates with the physiological development cycle of the immune system.

The findings in the report established that the distribution of malaria prevalence was linked to the seasonal variations (such as drought and flooding conditions) and malaria control efforts that have been put in place to date. The study also found out that the bigger the household size, the higher the malaria prevalence owing to the increasing chances of contracting it from another household member. In order to fully maximize on this factor, it (study) recommended that there should be linkages with other sectors such as Reproductive Health (RH), through Family Planning Services (FPS). The prevalence of malaria was considered for both males and females and it was found that the male population was just as likely to suffer from fever and other malaria related illnesses as the female population.

The World Health Organization (2004), in *Strengthening Monitoring and Evaluation of Malaria Control Programmes*, reports of the "increase in resistance to Chloroquine and Sulfadioxine Pyramethamine in Bangladesh. The country is also facing challenges in obtaining feedback on its Malaria Control Programmes. For example, countries with 1 million malaria cases, only 55909 positive cases were reported and only about 577 deaths were reported in 2003. The figures are said to be far below the real national incidence of positive cases. Although the country is supposed to have feedback on its Malaria Control Programmes, the reports are normally neither complete nor timely. All in all, the Malaria Control Programmes in Bangladesh have failed to produce the positive results that the government and the other stakeholders had envisaged.

The information on Bangladesh was useful to this study, since it shows the impact of Malaria Control Programmes in a developing country. It provoked the researcher to investigate whether or not the Malaria Control Programmes in Zambia had similar impacts as those in Bangladesh.

The World Health Organization Report (2004) also reports on the impact of the Malaria Control Programmes in the five borders of Bhutan where the use of bednets and antimalarial drugs saw a decline in the malaria cases from 12591 in 1999 to only 3806 in 2003. The researcher found this information helpful because it showed that the impact that Malaria Control Programmes have had in Bhutan, could be similar to Zambia. This ignited curiosity in the researcher to conduct an empirical study in order to confirm or disconfirm the assumptions that the Malaria Control Programme in Zambia had a similar impact to those in Bhutan.

India is yet another country where the impact of Malaria Control Programmes has been assessed. In that country, the National Antimalarial Programme (NAP) is now part of the National Vector Borne Disease Control Programme (NVBDCP). In India, out of the nearly 100$ million blood slides that are collected each year, two million are malaria positive. Early Diagnosis and Prompt Treatment (EDPT) is the main thrust of the programme with the introduction of the Blister Packs for adults, and while the use of Indoor Residual Spray (IRS) is declining, Insecticide Treated Bednets (ITNs) are promoted to prevent malaria. Surveys have shown acceptance of nets by the community.

In Indonesia some success stories have been recorded with regard to the Malaria Control Programmes. The World Health Organization (2004), reports of successes in Monitoring and Evaluation (M&E) and Geographical Information System (GIS) in the area of Benjarneggara. The district has designed a system for monitoring the implementation of the Malaria Control Programmes. However, the improved M&E and GIS has not led to any significant reduction in the number of malaria cases in Indonesia. The Malaria cases in the outer islands of the country have gone up by 25% since the start of the implementation of the programmes in early 2000. The programmes are running on a pilot basis in 70 selected districts.

It is interesting to note that the types of programmes running in Indonesia were similar to the ones running in Zambia. The researcher was interested in finding out

whether or not similar Malaria Control programmes in Zambia had the same impact as those in Indonesia. Further, the programmes in Indonesia were targeting only selected districts on a pilot basis, where as the programmes in Zambia were countrywide and mainly permanent. The researcher wanted to know whether or not the assessment of the Malaria Control Programmes through the use of different methodology would show different results.

Maldives, a country with a population of 270,101, in 2001 managed to contain malaria outbreak to very insignificant levels, much to the boom of its tourism industry with 300,000 tourists visiting the country annually. The country has facilities for the collection of blood smears at airports and seaports. In 2003, about 14,637 blood smears were examined and only 3 positive cases were detected. None of them were indigenous. The previous year (2002), there were 10 positive cases and half of them were detected in tertiary hospitals. Entomological investigations have been carried out as a preventive measure. However, the country still feels dissatisfied with its performance with regard to the management of the malaria information, limited facilities and limited funds for refresher training and research into malaria management.

The tremendous positive results that Maldives has recorded in its Malaria Control Programmes were of interest to this study in order to know how the programmes in Zambia had performed, in case there were any lessons that one of the two countries would have to learn from the other.

In Sri Lanka, there was a consistent decline in malaria cases between 1999 and 2003. About 10,510 cases and only 2 deaths were reported as compared to 211,691 cases and 115 deaths in 1998. The spread of chloroquine resistance has been contained through the regulation of drugs and ensuring treatment compliance. There is a drastic decline in the problem of malaria in the conflict affected north-eastern province. Despite these achievements, the country nevertheless faces certain challenges in its fight against malaria, namely, the problems in Monitoring

and Evaluation due to lack of information from the private sector, low attention attached to the incidence rate of the disease, poor cooperation in Active Case Detection (ACD) in the target communities due to poor visibility of malaria, limited data generated by entomological teams, and non-generation of routine data on bednet use.

Nevertheless, this study benefited from the information on Sri Lanka, as it showed that the impact of the Malaria Control Programmes in Sri Lanka were highly positive though with some challenges. The researcher conducted the study in Zambia with a view to compare the impact of the Malaria Control Programmes in Zambia to those in Sri Lanka. The study would also show whether or not the challenges facing the implementation of the Malaria Control Programmes in Sri Lanka were also being faced in the implementation of the programmes in Zambia. Whereas Sri Lanka has a National Malaria Policy, Zambia does not.

In Thailand, with the continued decline in malaria, the National Malaria Control Programe (NMCP)'s objective is to reduce morbidity and mortality due to malaria in 30 border provinces. Due to the use of Artesunatehere Mefloquine Combination (AMC), there has been a decline in malaria in the Thai population. However, this decline does not show in the non-Thai population groups. Generally, the proportion of Plasmodium falciparum is decreasing. The last malaria epidemic was reported in 1999 when 67263 cases of Plasmodium falciparum were reported. However, based on the monitoring of therapeutic efficacy, the country is revising its policy on antimalarial drugs.

The information on Thailand gave the researcher an insight into the impact of antimalarial drugs on combating the malaria epidemic. Since this intervention is also used in Zambia, the researcher was interested in finding out whether or not the use of antimalarial drugs had also contributed to a decline of malaria cases in Zambia. The Thai case also helped the researcher to know that the efficacy of a Malaria Control Programme could be different on different racial groups within a

given population. The researcher was keen to finding out whether this was also true for Zambia.

Timor-Leste a developing country with a population of 849,699, has all its 13 districts affected by malaria. In 2003 alone, 13,772 malaria cases were reported. The country has Plasmodium falciparum proportion of 67%. Within 2003 alone, 134 deaths from malaria were recorded from 9 of the 13 districts in the country. The country has reported some remarkable failure of the Malaria Control Programmes in the country with 67% Plasmodium falciparum treatment failure in one of the districts. The country's Malaria Control Programmes have also been pushed back by the inadequacy of healthcare professionals and the limited skills of the available personnel in respect to malaria diagnosis. This information was helpful to the researcher as it provided him with the data about the impact of malaria treatment programme. However, the information is only providing the impact of one Malaria Control Programme, treatment. This study, conducted in Zambia, not in Timor-Leste, on comparative basis, intended to prove whether two (2) different environmental conditions could yield similar results.

Another country that has been pursuing aggressive Malaria Control Programmes is Cameroon. The World Economic Forum (2006) in the *Guidelines for Employer-Based Malaria Control Programmes*, reports that malaria was the leading cause of death in Cameroon (35%). In a large-scale Malaria Control Programme co-financed by Exxon Mobile and the World Health Organization (WHO), the country embarked on mandatory awareness and education activities, rapid screening for expatriates, water draining and the distribution of Insecticide-Treated Nets (ITNs). After the first year of implementation, the malaria incidence in the country reduced by 70%. The malaria incidence was highest in the peri-urban areas which housed mainly the lowly ranked industrial workers.

Like in Timor-Leste, the information on Cameroon was found useful for purposes of comparison of the environment in two African countries, vary much at the same

level of the Socio-Economic and Socio-Political development. Cameroon, a sea-faring country, has a coastal zone, which Zambia, a land locked country, is without. This contrast was vital for Zambia with a vastly different terrain and other ecological conditions.

The United States Government Accountability Office (2005), undertook a mission "to describe key implementation challenges and strategies for addressing those challenges in the *Global Malaria Control: US and Multinational Investments and Implementation Challenges*". It is understood that the United States government has played a frontline role in the fight against malaria through direct investments to support implementation of National Malaria Control Programmes in endemic countries through the United States Agency for International Development (USAID), and through partner organizations such as the Global Fund.

Augustine Kwasi Fosu *(Malaria and Poverty in Africa - 2007)* examines the economic burden of malaria in Africa. He presents four (4) country case studies drawn from different parts of Sub-Sahara Africa (SSA): East (Kenya), West (Nigeria), Central (Cameroon) and Southern Africa (Zambia). According to him the economic toll in Africa amounts to least ten (10) percent of gross domestic product per year and that the cumulative effects of malaria are enormous.

Fosu argues that the debate should now shift from malaria eradication to control, for the objective of malaria eradication, which was thought to be achievable in the 1940s and 1950s, is now believed to be unattainable. Thus, appropriate cost benefit analysis is required to determine the level and nature of malaria control programmes. Furthermore, a proper measurement of the economic benefits of malaria control requires that the effects of other intervening factors on malaria reduction be isolated. He further argues that identifying such factors and disentangling their effects in turn require generating additional information that can be used to design malaria control programmes and measure their economic effects.

According to the author, ninety percent (90%) of the malaria cases are managed at home and that most categories associate malaria with mosquito nets. He notes that although nearly fifty percent (50%) of households use mosquito nets to prevent malarial illness, they are unaware that insecticide treated bed nets are a relatively effective means of malaria prevention, suggesting that health education can be an important strategy for malaria control.

For the case study on Zambia, Fosu examines the issue of pharmaceutical supplies in relation to national malaria control efforts. He shows that malaria is endemic in Zambia and that up to twenty percent (20%) of the mortality in the country is attributed to malaria. And that since 1976, malaria prevalence increased rapidly from 122 cases per thousand to nearly 400 cases per thousand in 1978.

Fosu identifies six (6) main sources of drugs and pharmaceutical supplies for the health facilities in the country: Private, retail and wholesale distribution system, the local drug manufacturers, the Ministry of Health (MoH), the Non Governmental Organisations, donors and the Medical Stores Limited (MSL). Most of the pharmaceutical products used in the country are imported. The MoH is the largest importer, accounting for forty six (46%) of the value of drug imports in 1996. The wholesalers sell drugs at a profit to commercial pharmacies, and to health facilities.

The MSL, which has a special role in the area of pharmaceuticals drugs, is an example of an organisation that both imports and distributes drugs directly to the retailers. It serves as the government's storage and distribution agent, and is responsible for distributing to individual health facilities drugs procured directly by the MOH. In addition, it distributes essential drug kits financed by donors to all health centres in the country at a fee. Fosu, however, notes that despite the elaborate drug system the government facilities experience frequent shortages of anti-malaria drugs. These shortages are partly blamed for the emergence of drug-

resistant malaria in Zambia. In particular, the shortages have been associated with sub-optimal treatment of malaria using chloroquine, which in 1990s was still the drug of choice in Zambia, as in other countries in Africa, for the first line of malaria treatment. The chloroquine failure rate is fifty two percent (52%) which means that only about half of the malaria patients treated with chroloquine recover. Alternative anti-malarial drugs in the country, and less commonly used, include fansidar, quinine and coartem.

The author argues that the main factors contributing to drug resistant malaria in Zambia include: outdated malaria prevention methods, high costs of insecticide treated nets, introduction of cost sharing in public health facilities; and the lack of malaria diagnostic equipment in government health facilities.

As a strategy effectively combating malaria in Zambia, Fosu recommends a modification in drug policies, emphasizing discontinuation of chloroquine as the first line of treatment, given its high failure rate. He argues that switching to other drugs is feasible because alternative anti-malarial drugs are available, and are acceptable to the government and the general population.

According to Fosu's case studies in the selected countries i.e. Nigeria, Cameroon, Kenya and Zambia, the malaria programmes were based on a combination of malaria treatment and prevention activities. He concludes that the main determinants of the demand for malaria treatment include the availability of anti-malaria drugs, the cost of treatment and socio-economic characteristics of patients such as education, sex and age. In particular, the cost of care at health facilities reduces the demand for malaria treatment, as does the non availability of anti-malarial drugs. Education increases the utilisation of modern health facilities for malaria treatment and reduces the probability of utilizing anti-malarial drugs of uncertain quality.

Fosu's literature is useful to this research in the sense that it dwells in detail on the MCPs i.e. their operations, failures and successes. However, his work emphasises more on the MCPs and does not dwell much on the impact of MCPs, which this study intended to tackle. His case study on Zambia also widens the scope of the research. The researcher was interested in conducting the study in Zambia alone and in the rural district of Kafue, which was not Fosu's focus. The results would be compared to those of Fosu's study, and some lessons learnt.

To sum up the literature review, it has shown what is and is not relevant in the topic, and what gaps exist between the focus of the study and findings of the other researchers.

1.12 Methodology

The study assessed the prevention and control programmes in the fight against malaria. This included the promotive approaches, which were based on the dissemination of knowledge through information, education, and communications materials. The study also assessed the use of Insecticide Treated Nets (ITNs), repellents, malaria vaccination, Residual Insecticide Spraying (RIS), Chemoprophylaxis for high risk groups (i.e. pregnant women and sicklers). However, the study did not dwell much on the Environmental Management (EM) and Curative Programmes (CPs) in the fight against malaria. The control measures investigated included the use of Insecticide Treated Nets (ITNs), Repellants, Malaria Vaccination, Residual Insecticide Spraying (RIS) and Chemoprophylaxis for high risk groups (pregnant women and sicklers). The study did not cover Environmental Management (EM) and Curative Programmes to combat malaria. The research, which was a case study, employed both qualitative and quantitative approaches.

The effectiveness of the measures was verified not only by the views of the community members from the shanty compounds, but importantly by records from various Health Institutions in the district.

1.12.1 *Data Collection and Techniques of Analysis*

Primary data was collected from sampled respondents through administered and self-administered questionnaires. This was meant to cover both the illiterate and the literate population. More data was collected through secondary sources such as relevant documents, magazines, journals, books among others.

1.12.2 *Sample Size and Area*

Kafue is an industrial town, 42 kilometers south of the Capital City, Lusaka. The town has a population of two hundred thousand (200,000) people with a growth rate of 3.2% (Shack and Mansion, 2004:48). It has the following health institutions: Kafue District Hospital, Nangongwe Clinic, Railway Clinic and Kafue Estates. These institutions provide health services to people of the area, including those living in shanty compounds. Among shanty compounds are the following: Zambia compound, Kaseba and Kabuchende. Zambia compound, Kafue's biggest township, also known as ZC by abbreviation, was the focus of the study. Most of the residents of the compound are fishermen, street vendors, marketers and workers in various factories. Within this big compound are three (3) household clusters namely; Lumumba, Mtendere, and Soloboni, with a total population of about sixty two thousands (62 000) (ibid, 48). The total sample size was one hundred and eighty nine (189) respondents drawn from the universe of the adult population. It was distributed as follows:

1.Lumumba	-	61 respondents
2.Mtendere	-	61 respondents
3.Soloboni	-	61 respondents

Six (6) key respondents were also drawn from the following institutions:

(i) Kafue District Council Health Department – 1 respondent; this provided information on the preventive measures the council is conducting.

(ii) Three (3) local clinics (Nangongwe, Railway and Kafue estates) - 3 respondents; these provided data on the number of malaria cases brought to the clinics, number of deaths as a result of malaria, curative methods, determining whether or not there has been a reduction of the malaise.

(iii) Local political leadership-councillors: 2 respondents provided details on the contribution of local political establishment towards the fight against malaria. This was to establish the issue of political will in the fight against malaria.

The purposive selection of key respondents was justified on the grounds that by virtue of their position of authority they were expected to be more knowledgeable than others about the performance of MCPs. Hence, they provided better information. However, it is assumed that ordinary community members were also expected to be knowledgeable and hence their participation through selected representative sample.

Generally, it was the assumption of the researcher that the selected sample of one hundred and eighty nine (189) respondents was sufficiently representative of the diverse community groups or strata in Kafue, and as such, it was hoped to bring out the true picture of the impact of MCPs.

1.12.3 *Techniques of Data Analysis*

As stated in the preceding paragraph of the work, both primary and secondary data collected were first classified, recorded, analysed and interpreted manually. Thereafter it was fed into the computer software known as Statistical Package for Social Scientists (SPSS) for final processing, analysis and interpretation.

This section endeavours to give the major characteristic make-up and background of the sample. Summaries are given in terms of frequency tables and simple Bar Graphs. The sample under study constitutes 183 individuals drawn from Kafue district in the Republic of Zambia. Subjects were independently and randomly drawn from Kafue's Zambia Compound made up of three shanty compounds namely Lumumba, Soloboni and Mtendere. Equal samples of 61 were selected from each of the three compounds.

Though this is not directly linked to the subject matter of the study, it is quite relevant to understand what composed the sample. This report therefore gives this salient information. This would help to understand some responses given by these respondents. Moreover, sample characteristics would prove the randomness in the selection of the sample. Generalization, about variations on the impact of the malaria programme would also greatly depend on the knowledge of the sample composition. Therefore only those areas or places with similar population composition to the study population (Kafue) would conform to the findings of this research. The sample studied herein had the following characteristics.

1.12.4 *Sex Composition*

The sample of independently and randomly selected subjects included both males and females. About 62% (113) were females, where as only 36% were males. Three (3) Individuals/subjects had their gender not stated (missing). These constitute about 2% of the sample. The bar graph and the Frequency table below give summaries of sex composition.

Figure.1.1. Bar Graph: Sex Composition

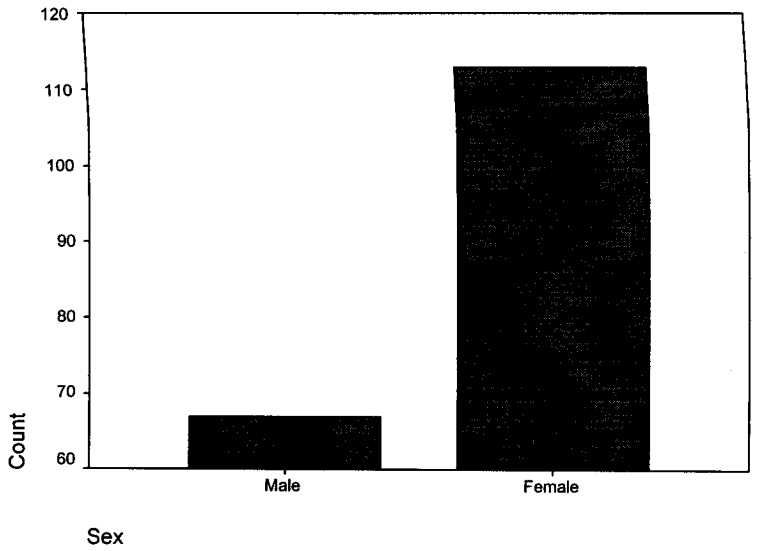


Table 1.4 Frequency Table: Sex Composition

Sex

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Male	67	36.6	37.2	37.2
	Female	113	61.7	62.8	100.0
	Total	180	98.4	100.0	
Missing	9	3	1.6		
Total		183	100.0		

1.12.5 Age Distribution

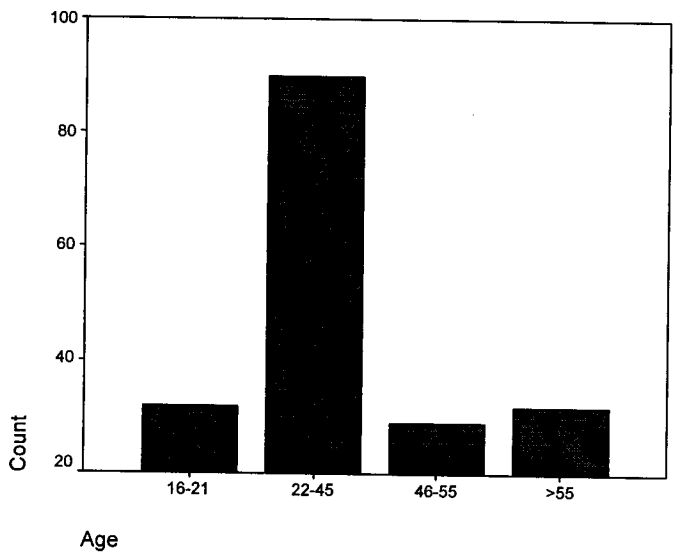
The study was restricted to persons above sixteen (16) years of age grouped as follows: 16-21; 22-45; 46-55 and above 55. About 50% (90) of these subjects were aged between 22 and 45 as shown in the table below. This composed the largest proportion of the respondents under study. The Rest of the groups had almost equal distribution of the remainder, i.e. about 17% per group as shown on the table below.

Table 1.5 Frequency Table: Age Composition

Age

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	16-21	32	17.5	17.5	17.5
	22-45	90	49.2	49.2	66.7
	46-55	29	15.8	15.8	82.5
	>55	32	17.5	17.5	100.0
	Total	183	100.0	100.0	

Figure 1.2. Bar Graph: Age Composition



The bar chart summarizing age distribution, by bars also shows that the most prominent age group is 22-45, with the highest bar. The rest of the groups had minimal representation.

1.13.6 *Marital Status*

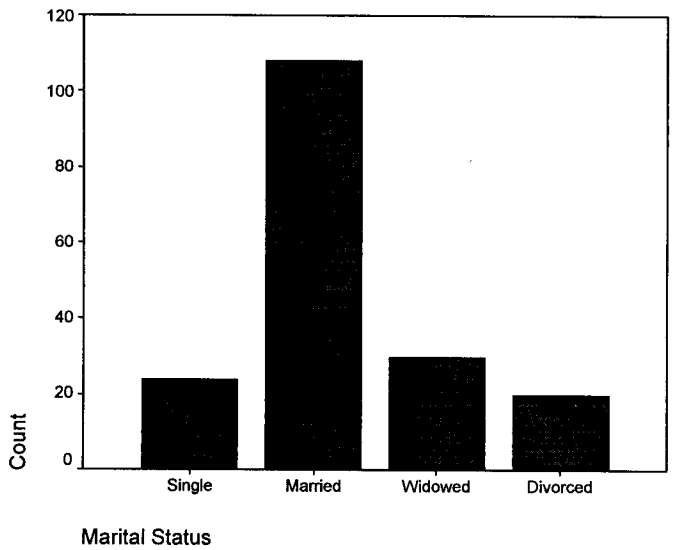
The sample included both the married and the unmarried (single, widowed, and divorced). Collected data revealed that about 60% (108) of the respondents were married while 16% (30) were widowed, 13% (24) were single, and 11% (20) were divorced, the three constitute the unmarried. The table below shows precise percentages of representation per category.

Table 1.6 Frequency Table: Marital Status

Marital Status

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Single	24	13.1	13.2	13.2
	Married	108	59.0	59.3	72.5
	Widowed	30	16.4	16.5	89.0
	Divorced	20	10.9	11.0	100.0
	Total	182	99.5	100.0	
Missing	9	1	.5		
Total		183	100.0		

Figure 1.3 Bar Graph: Marital Status



The bar graph similarly shows that most of the respondents were married, followed by the widowed. Singles and divorced were also captured but very few in representation, as shown by the height of the bars above.

1.12.7 *Family Size*

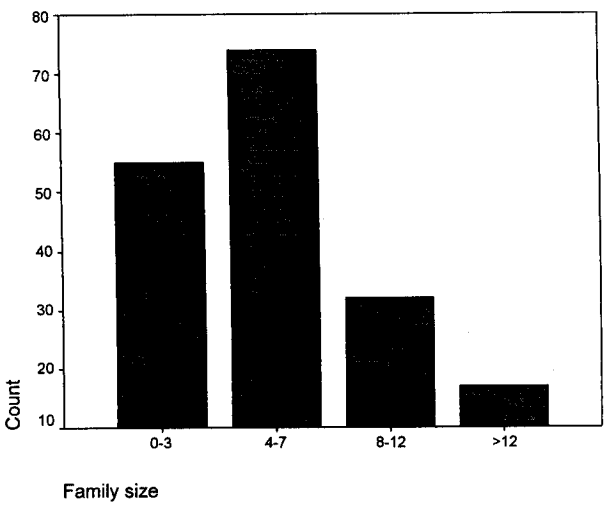
All subjects in the sample under study belonged to at least a family. Most of the families from which the subjects were drawn were of the size less than eight. These constitute 72.5% of the valid cases in the sample from which about five cases (3%) are missing. About 28% belonged to families of more than 8.

Table 1.7. Frequency Table: family Size

Family size

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	0-3	55	30.1	30.9	30.9
	4-7	74	40.4	41.6	72.5
	8-12	32	17.5	18.0	90.4
	>12	17	9.3	9.6	100.0
	Total	178	97.3	100.0	
Missing	9	5	2.7		
Total		183	100.0		

Figure 1.4. Bar Graph: family Size



The bar chart, showing by the family size distribution, indicates that the largest proportion of respondents was drawn from families of less than eight. The most prominent was found to be families of 4 -7, as shown on the graph above.

1.12.8 *Education levels*

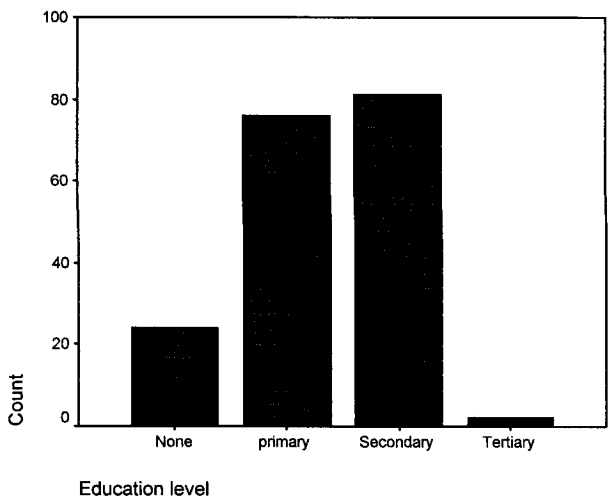
Literacy level seems to be high in the district as only 13% (24) of the sample was illiterate (no education). A good number of subjects have primary and secondary education. These constitute 41.5% and 44.3% respectively. However, only two of the 183 subjects had tertiary education, as shown on the table below.

Table 1.8. Frequency table: Education Levels

Education level

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	None	24	13.1	13.1	13.1
	primary	76	41.5	41.5	54.6
	Secondar	81	44.3	44.3	98.9
	Tertiary	2	1.1	1.1	100.0
	Total	183	100.0	100.0	

Figure 1.5. Bar Graph: Education Levels



1.12.9 *Employment Status*

Considering employment levels, the data collected revealed that only 14.2% (26) were formally employed and another 34.4% (63) being self employed. About 38% (69) were unemployed while about 14% (25) were either retired or retrenched.

Table 1.9. Bar Graph: Employment Levels

Employment Status

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Employed	26	14.2	14.2	14.2
	Unemployed	69	37.7	37.7	51.9
	Retrenched	9	4.9	4.9	56.8
	Retired	16	8.7	8.7	65.6
	Self-employed	63	34.4	34.4	100.0
	Total	183	100.0	100.0	

Figure 1.6. Bar Graph: Employment Levels

1.13 *Limitations of Study*

There were limitations in this study which had a negative impact on the research findings which included among others the following:-

1. This being a case study in Kafue town, its findings can only be generalised in the confinements of urban and peri-urban areas.
2. Budgetary constraints made it difficult for the researcher to conduct the research within the anticipated time frame

CHAPTER TWO

THE MALARIA CONTROL PROGRAMMES PUT IN PLACE IN THE SHANTY COMPOUNDS OF KAFUE AND THEIR PERCEIVED IMPACT

2.1 Overview

In the effort to fight malaria, Kafue District Council has in the recent past embarked on different programs with the view of either reducing or completely eradicating malaria. These include, among others, promoting the use of ITNs; provision of Malaria Preventive Drugs (MPD); residual spraying; awareness campaigns and destruction of possible breeding environments for mosquitoes. These are the direct methods carried out as interventions by the council at an empirical cost to society. Besides, individuals employ several other means without necessarily involving the council. It may also be necessary to compare effectiveness of these methods to those by the council. They include ordinary spray, use of mosquito coils etc. There is therefore need to establish whether there is a corresponding benefit to society. This analysis, for argument's sake, considers also such exogenous factors as education. Education is widely believed to influence disease patterns, not only malaria. The argument lies in the fact that those with better education are likely to have a better understanding of different preventive measures of diseases, and apply the most appropriate and effective. To this effect, education was adopted as one variable to be examined in relation with malaria.

Having known the major characteristics of the sample and the interventions being carried out, it was prudent to examine the two dependent variables of interest on which analysis was to be based. These are:

1. **Frequency of malaria occurrence**: Every intervention both by the council and by individuals was examined based on the effect it has on frequency of malaria occurrences. It is ideally expected that every good intervention will at least lead to the reduction in malaria incidence rates. To this effect every intervention was examined, basing resulting malaria incidence as the judgment of its effectiveness.

2. **The number of family members lost**: Another dependent variable on which conclusions were based is 'the number of deaths in a family resulting from malaria. Like malaria frequencies, it is also ideally expected that all good interventions will reduce the number of lives lost due to malaria, both in individual homes and in the community at large.

This was to facilitate the verification of whether or not there existed significant correlations between any two variables from the two strata. Other than eye check and mere comparisons, Chi-square tests were conducted to establish an empirical existence of relationship of variables being examined. This was done at a 5% level of significance (α) unless otherwise stated.

The chi-square value (P-value) was calculated using the computer programme SPSS. The Degrees of Freedom (Df) were calculated manually using the general formula given below.

$$Df = (\lambda - 1) \times (\mu - 1)$$

Where:

λ is the number of rows, and

μ is the number of columns.

Decision Rule: Conclusions were arrived at as follows:

- If P-value is less than α (5%), then there is significant relationship between the variables.
- If P-value is greater than α (5%), then there is no significant relationship.

To facilitate comparisons and proof of responses given, it was found necessary to contact another group of special respondents. Those are Kafue District Council, two ward councillors (political leaders) and the three Health Centres in Kafue district. The idea was to avail professional data on the incentives provided to fight malaria in the district. It was disclosed that sensitization campaign was the first priority for all of them. The council also revealed that they conducted door-to-door spraying of houses in the district, while the three clinics provided preventive and curative drugs to patients. It was reported that among the curative drugs provided,

Fansidar was the most effective. However, lack of resources due to poor financing was reported to be the major constraint leading to compromise in the provision of services.

2.2 Relationship between Level of Education and Malaria Occurrence

Educational level has always been said to affect living standards and attitudes towards change. The generally conceived and ideal situation is that those people with higher education and generally literate would be in a better position to understand diseases and most appropriate counter reacting methods. Logically, this is expected to have an impact on the influence of malaria occurrence and on deaths resulting from malaria complications. Education was, therefore, measured on four scales, denoting different levels as generally conceived. They were as follows :

None: this was a group of respondents deemed illiterate. They include those who have not gone as high as primary school, nor are able to read nor write.

Primary: this group comprises all respondents with grade seven certificates. They, unlike the first group, can at least read and write, though with limited understanding.

Secondary: this group constituted respondents who have gone beyond primary education and are holders of either grade nine or grade twelve certificate. Their own reading and writing skills are deemed higher than those for the preceding two groups. Rational expectations are that their own understanding would be much better and thus be in better position to read and understand malaria preventive measures.

Tertiary: this was the highest level considered. It includes only those who have gone beyond secondary school level and have been either to Colleges or Universities. Of course, this group is viewed as the most educated and with excellent reading and writing skills.

To determine the relation between education attainment and malaria, two separate cross tabulations were constructed. The first one sought to

compare educational attainment with frequencies of malaria occurrence in a family, as shown in the table below.

Table 2.1. Cross tabulation

Education level * Frequency of Malaria occurrence in family Cross tabulatio

% within Education level

		Frequency of Malaria occurrence in family			
		Weekly	Monthly	Yearly	Total
Education Level	None	18.8%	68.8%	12.5%	100.0%
	Primary	10.1%	69.6%	20.3%	100.0%
	Secondary	10.8%	63.5%	25.7%	100.0%
	Tertiary			100.0%	100.0%
Total		11.3%	66.3%	22.5%	100.0%

Alpha (α) = 0.05

p-value= 0.453

df = 6

The data collected, as per rational expectation, revealed that none of the people with tertiary education ever experience weekly or monthly malaria cases. On the contrary, among those without any education whatsoever, 68.8% reported monthly experiences and 18.8% weekly experiences. However, the other two levels of education considered showed a similar pattern of malaria cases as those without education, with only minor differences. This may make eye interpretation of the relationship difficult. It was found that 69.6% of those with primary education and 63.5% off those with secondary education had monthly experience. This is not very different from the 68.85 of those without education. Further, 10.1% of those with primary education and 10.8% of those with secondary education experienced malaria weekly. Well, quite different from the 18.8% 0f those without education. A cross tabulation between educational level and frequency of malaria occurrence (Table 2.1.) reveals that in the first three levels of education the majority; 68.8%, 69.6% and 63.5% respectively, had monthly occurrences while 100% of the tertiary educated had annual

occurrences. However, test results revealed that there is no sufficient evidence to suggest that educational level has an effect or influence on the frequency of malaria occurrence. On the contrary, evidence shows no weekly or monthly occurrences at tertiary level.

The second cross tabulation examined the relationship between education attainment and the number of lives lost in a household. As in table 2.2 below, results showed that two thirds of the illiterate experienced no deaths while half of the tertiary educated experienced no death. 25% of the illiterate experienced 1-5 deaths as opposed to 50%, 33% and 30% of those with tertiary, Secondary and primary Education respectively. On the other hand, among the illiterate, a total of 8.4% (i.e. 4.2% + 4.2% for 6-10 and above 10 respectively) experienced more than five deaths, whereas no more than five deaths were experienced by those with tertiary education. These results seem to favour education in terms of reducing experiences of more than five deaths; however, the illiterates experienced fewer deaths of category 1-5 than the educated.

Table 2.2. Cross tabulation

Education level * Number of family members lost Crosstabulation

% within Education level

		Number of family members lost				
		0	1-5	6-10	>10	Total
Education level	None	66.7%	25.0%	4.2%	4.2%	100.0%
	primary	60.5%	30.3%	9.2%		100.0%
	Secondary	64.2%	33.3%	1.2%	1.2%	100.0%
	Tertiary	50.0%	50.0%			100.0%
Total		62.8%	31.1%	4.9%	1.1%	100.0%

Alpha (α) = 0.05

P-value = 0.436

df = 9

A chi-square test was conducted to establish the existence of any relationship and its direction. The chi-square value observed (0.436) as in the earlier case, is by far greater than the confidence level (0.05). These test results show that any correlation that might be thought of is highly insignificant and it would therefore be correct to conclude on the basis of these results that no relationship exists between educational level and number of deaths resulting from malaria complications.

2.3 Impact of the Malaria Control Programmes

The research findings show that different malaria control programmes had different impacts on the fight against malaria. These are presented and discussed below:

2.4 Awareness of Malaria Preventive Programs (MPP).

Kafue district council revealed that one way of malaria prevention actively used in the area is the use of Awareness campaigns. This is done by way of mass communication and education to the locals voluntarily provided by the council. An aware population is in a better position to avoid malaria. It is therefore rationally expected that those who are aware should experience fewer or no malaria cases than those not aware. Kafue district council, therefore, engaged in this programme with a view that as many people get some awareness, malaria will be easily combated, especially with several other efforts at play. A cross tabulation of this variable with frequency of malaria occurrence was therefore constructed. Results showed that only 9.2% among those reached by the awareness campaigns had weekly experiences of malaria whereas 26.3% of those not covered at all had weekly experiences. This would suggest that awareness programmes work a great deal in reducing malaria incidence rates. However, on monthly experiences, 68.8% of those reached had monthly experiences, whereas only 47.4% of the group of respondent not covered in the programme had

monthly experiences. On yearly experiences, it is seen that there were fewer experiences among those reached than the rest of the population (i.e. 22.0% for the aware and 26.3% for those not aware). These conflicting results really do not seem to show the direction of the relationship. A chi-square test was, however, conducted to establish the existence of any relationship and the direction.

Table 2.3: Cross tabulation

Awareness of MPP * Frequency of Malaria occurrence in family Cross tabulation

% within Council spraying

		Frequency of Malaria occurrence in family			
		Weekly	Monthly	Yearly	Total
Awareness Of MPP	Aware	9.2%	68.8%	22.0%	100.0%
	Not aware	26.3%	47.4%	26.3%	100.0%
Total		11.3%	66.3%	22.5%	100.0%

Alpha (α) = 0.05

p-value = 0.059

df = 2

Test results revealed that there is no significant relationship between these two variables at 5% level of significance. This shows that awareness campaigns in the prevention of malaria are ineffective.

2.5 Malaria Preventive Drugs (MPDs)

It was among the research objectives to asses how effective MPDs are in fighting Malaria. Collected data showed that some Kafue residents do take Malaria Preventive Drugs and some do not. To ascertain the real effect, comparisons were made on the two categories of respondents i.e. those that take and those that do not in relation to the number of malaria cases and deaths in the two groups. Computations disclosed that only 2.6% of those who take preventive drugs experienced malaria cases weekly, where as 19.5% of those who didn't take preventive drugs experienced malaria cases weekly. 20.5% of those who consume preventive drugs experience malaria monthly. 76.9% experience it yearly. 56% of those who do not take MPDs experience the problem in their families monthly and 24.4% yearly, respectively. These comparisons seem to favour preventive drugs to non consumption.

Table2.4. Cross tabulation

Consumption of malaria preventive drugs * Frequency of Malaria occurrence in a family Cross tabulation

% within Consumption of malaria preventive drugs

		Frequency of Malaria occurrence family			
		Weekly	Monthly	Yearly	Total
Consumption of malaria preventive drugs	Yes	2.6%	20.5%	76.9%	100.0%
	No	19.5%	56.1%	24.4%	100.0%
Total		11.3%	66.3%	22.5%	100.0%

Alpha (α) = 0.05

p-value = 0.001

df = 2

The conducted chi-square test showed significant difference in the experience of malaria cases even at 1% significance level. This clearly shows that Malaria Preventive Drugs are very effective in reducing malaria occurrences in families.

2.6 Council Residual Spraying

The intervention of Kafue District Council in fighting malaria through residual spraying raised interest in the research to find out its effectiveness. A number of local authorities in Kafue were interviewed to ascertain if there is really indoor spraying in the compounds by the council. They confirmed that the programme has been running for some time but financing has always been a problem leading to compromise in the results. To this effect, not all houses are covered in the programme. Comparison thus was made in terms of those houses covered and those that are not in relation to the number of malaria cases and deaths experienced in the two groups.

Table 2.5. Cross tabulation

Council spraying * Frequency of Malaria occurrence in family Cross tabulation

% within Council spraying

		Frequency of Malaria occurrence in family			
		Weekly	Monthly	Yearly	Total
Council spraying	Yes	2.9%	17.1%	80%	100.0%
	No	16.9%	56.2%	27.0%	100.0%
Total		10.7%	66.7%	22.6%	100.0%

Alpha (α) = 0.05

p-value = 0.002

df = 2

At face value, there seem to exist a relationship between residual spraying and occurrence of malaria. It was found (Table 2.5) that among those that had their houses sprayed by the council, 2.9%, 17.1% and 80% compared to 16.9%, 56.2% and 27.0% respectively, experienced malaria cases weekly, monthly and yearly respectively. Spraying seem to be effective, especially in reducing weekly and monthly Malaria occurrences. Spraying does not seem to be effective in reducing yearly occurrences of Malaria. An in-depth examination using chi-square test on the collected data revealed significant relationship even at 1% significance level. This proves that spraying plays a significant role in the prevention of malaria.

2.7 Insecticide Treated Nets (ITNs)

Insecticide Treated Nets are seemingly a new found solution in the fight against malaria in Zambia. The government of the Republic of Zambia, in conjunction with NGOs and Health Organisations has in the recent past embarked on subsidising ITNs for local consumption. These are readily provided in most Health Centres at a very low cost to make them affordable even to the under privileged, especially pregnant and nursing mothers. The increasing use and persistent advocacy on ITNs suggests that this could be

a more effective way of controlling malaria. To assess the relationship between the two, relevant data was collected on whether families covered in the research use ITNs or not. It was disclosed that some do use and some do not. Collected data further revealed that (Table 2.6) among those who use, 12.9%, 68.2% and 18.8% experienced malaria case in their families weekly, monthly and yearly respectively. On the other hand, 9.3%, 64% and 26.7% of those who don't use ITNs have malaria cases weekly, monthly and yearly respectively, in their households. The differences, though present, are minor making it difficult to establish the relationship between malaria and use of ITNs and the direction of the relationship, if any. This necessitated further tests for empirical conclusions.

Table 2.6: Cross tabulation

Use of ITNs * Frequence of Malaria occurance in family Crosstabulation

% within Use of ITNs

		Frequence of Malaria occurance in family			
		Weekly	Monthly	Yearly	Total
Use of ITNs	Yes	12.9%	68.2%	18.8%	100.0%
	No	9.3%	64.0%	26.7%	100.0%
Total		11.3%	66.3%	22.5%	100.0%

Alpha (α) = 0.05

p-value = 0.436

df = 2

The chi-square test was then conducted for further verification of the relationship. The p-value of 0.436 was obtained as seen above, implying no significant relationship. This renders use of ITNs not effective in the fight against malaria. Possibly the method has not fully been developed to give people full information on the correct usage.

2.8 Other Mosquito Control Measures

Other than the above interventions by the council and health institutions, individual households as well engaged in several other practices to fight malaria. Two methods were found commonly practiced across different households.

Ordinary Spray: Apart from residual indoor spraying by the council, households use other chemicals at their own costs. They include insect killers such as target, doom, etc. Spraying may be done regularly, especially in the evening when people are about to sleep. The idea is to clear all mosquitoes that might have entered the house during the day, there by preventing themselves from contracting malaria.

Mosquito Coils: mosquito Coils, like ordinary spray, are short term mosquito control chemicals. They are used on regular basis as can only work for a limited short span after application. Households, therefore, opt to use coils during late hours of the day to get rid of mosquitoes before getting to sleep.

It was in the interest of the research to find out how effective these methods are, especially that they are used at the expense of the users themselves. It was also felt necessary to make comparisons of these methods with the ones provided for by public institutions.

Research results revealed positive relationship of the above methods with malaria occurrence frequency. That proves the effectiveness of these methods as per rational expectation. It was further found that Coils are the most effective of all the other methods practiced as seen from Table 2.7 below. Only 6.5% of those who use Coils experienced malaria problems weekly in their families as opposed to 11.1%, 29.2% and 45.8% of those who use Ordinary spraying, other means and those who don't use any respectively.

Table 2.7.: cross tabulation

Other methods * Frequency of Malaria occurrence in family Cross tabulation

% within Other methods

		Frequency of Malaria occurrence in family			
		Weekly	Monthly	Yearly	Total
Other methods	Coils	6.5%	22.4%	71.0%	100.0%
	Spray	11.1%	11.1%	77.8%	100.0%
	Other	29.2%	37.5%	33.3%	100.0%
	None	45.8%	31.7%	22.5%	100.0%
Total		11.3%	22.6%	66.0%	100.0%

Alpha (α) = 0.05

p-value = 0.02

df = 6

A Chi-square test at 5% significance level further confirmed existence of direct and significant relationship. The chi-square value of 0.02 is small enough to conclude strong and overwhelming evidence. These results are a clear indication that households who may not have access to public intervention can still find remedy in private methods. It can, however, be empirically argued that some public methods are outstanding, as compared to use of coil or spray. Chi-square tests on Council Residual Spray and use of Preventive Drugs for example showed smaller chi-square values as compared to that of private remedies (i.e. 0.002 for Residual spraying and 0.001 for preventive drugs, whereas it was 0.02 for private methods). Public methods can therefore be said to be more effective and efficient in the fight against malaria compared to others. This then calls for enhancement and more concentration on public provisions, especially residual spraying and use of Preventive Drugs.

2.9 Stagnant Water

Science has it that the most common mode of transmission of malaria is through mosquito bites of Anopheles family. These breed in stagnant water. This implies that people who live in places with stagnant water are more prone to suffering from malaria. The research endeavoured to prove any

possible effect stagnant water has on malaria incidences. A cross tabulation of stagnant water and number of deaths in a family (Table 2.8) shows that only a quarter of the people that live in places with no stagnant water experienced deaths caused by malaria compared to about 40% of the other group.

Table 2.8. Cross tabulation

Stagnant water * Number of family members lost Crosstabulation

% within Stagnant water

		Number of family members lost				
		0	1-5	6-10	>10	Total
Stagnant water	Present	59.4%	33.1%	6.8%	.8%	100.0%
	Absent	75.0%	22.9%		2.1%	100.0%
Total		63.5%	30.4%	5.0%	1.1%	100.0%

Alpha (α) = 0.05

p-value= 0.045

df = 3

This seems to agree with human expectations that stagnant water is a potential breeding area for mosquitoes that carry malaria parasites. Test results show that there is a significant correlation between environment (stagnant water) and deaths resulting from malaria complications.

2.10 Constraints to the success of the MCPs

Various institutions, i.e. local political leadership, Non-Government Organisations (NGOs) and some residents of the compound (Zambia compound) cited several constraints which they felt impeded the implementation of the MCPs in the area. The following of constraints were identified.

2.10.1 *Health Institutions*

- Heavy patient workloads at health facilities, especially inpatient care, were a major constraint that made close personal clinic observation

of severe cases difficult. In many such cases, this gave patients and the community the impression that health workers were negligent, cruel and uncaring.

- Lack of drugs made malaria patients stay longer in hospital wards than necessary. Normally, malaria patients were supposed to stay in admission wards for three (3) days only. The lack of drugs made health workers refer outpatients to buy drugs from retail outlets elsewhere. This was discouraging to many patients.
- Too many patients presenting malaria cases made health workers take longer to have blood slides for confirmation of diagnosis. The laboratory facilities had no capacity to cope with the needs of the patients.
- The understaffing at the health institutions was a major problem.
- There was uncontrolled tendency of patients to buy and abuse malaria drugs.
- Most of the institutions in Kafue have no diagnostic facilities. This prompted the clinical staff to refer cases to the district hospital.
- Lack of ambulance services at the health institutions resulted in patients using hired transport, bicycles, wheelbarrows etc.

2.10.2 *Kafue District Council*

- The council was besieged with transport problems to ferry the workers and the chemicals. The council had no vehicle specifically allocated to carry out RIS programmes in the shanty compounds. Hired transport is used for the programmes.
- The council relied on old equipment to conduct the exercise of spraying. usually the pumps were faulty and could not be used for spraying in the compounds.
- Once the chemicals finished, it took long to replenish.
- There was lack of campaign materials (pamphlets, magazines etc) when the RIS programme was being conducted.

- The council had no trained staff to carry out the exercise of spraying the compounds, instead relied on hired labour.
- Lack of funds to purchase chemicals and equipment. The council was facing a lot of financial problems and as a result could not afford to sponsor RIS programme.
- Hostilities from the shanty dwellers who did not understand the programme hampered the programme.

2.10.3 Local Political Leadership

- The leadership complained of not being consulted by the council authorities whenever the programmes were being conducted. The political leadership needed to sensitise the community on the importance of MCPs. They also complained that the NGOs carrying out the MCPs in the compounds did not consult them.

2.10.4. *Non Governmental Organisations (NGOs)*

- The most active NGO in the shanty compound was the Christian Children's Fund (CCF) which was involved in the distribution of ITNs. CCF complained of lack of co-operation from Kafue District Council and the local political leadership. CCF stated that the groups (council and political leadership) took long to respond to MCPs proposals and were generally disorganised.

2.10.5 *Community (Zambia Compound)*

The community in the shanty compound complained of the following:-

- Lack of malaria drugs at the local health institutions, instead, were given prescription to buy them at the pharmacies. The drugs were very expensive at the local pharmacies.
- It took long to attend to patients at the health centres due to limited number of health workers.

- There were no diagnostic materials to detect malaria at most of the health centres.
- Lack of transport to take seriously ill patients to the health centres, as there were no ambulance services.
- Council took long to do a door-to- door residual spraying and there was no consistency in the programme.
- Chemicals used were not strong enough to kill the mosquito parasite as a result mosquitoes continued to spread the disease after the spraying had been done.
- There was no proper sensitization of the community on behaviour change in the control of malaria.
- ITNs were segregatively distributed by those distributing as the local political leadership was not involved in the exercise.
- Some ITNs came without accessories for hanging, as a result it became difficult to use them.
- The ITNs were not re-treated after the initial treatment.
- The ordinary spray (target, doom etc) bought from the shops at the residents' expense were too expensive for most of the residents to afford.
- The effect of spray did not last long after they were applied.
- The spray had a 'chocking' effect on the occupants of household after spraying.
- Mosquito Coils worked for a limited short span after application. They also caused irritation to the users.
- The mosquito coils were costly for the shanty compound dwellers.

CHAPTER THREE

CONCLUSION AND RECOMMENDATIONS

3.1 CONCLUSION

3.2 Overview

The study was conducted to examine the relationships between the different variables that were thought to contribute to the occurrence of malaria as well as deaths resulting from malaria complications. The main variable examined was the level of education as it relates to the various Malaria Control Programmes such as Awareness Programmes, Malaria Preventive Drugs, Council Residual Spraying, use of Insecticide Treated Nets (ITNs) and other Mosquito Control Measures.

The Malaria Control Programmes were either preventive or curative. The preventive ones included Awareness Programmes, Council Residual Spraying and the use of Insecticide Treated Nets (ITNs).

Notwithstanding differences in opinion, empirical evidence from the research showed that some preventive programmes were more successful than others. Though most of the variables were perceived to influence malaria occurrences, research findings showed no existence of significant relationship between malaria and most of the variables. For instance, it was discovered that education attainment, which is an exogenous variable in this case did not have any significant relationship with the rate of malaria occurrence at the individual and community levels.

Promotion of awareness programmes like Education was not supported by empirical evidence from the research in combating malaria. Test results revealed no significant link between the two variables. This means that

these programmes did not have any big impact on malaria prevention. This renders awareness campaigns not useful in preventing malaria incidence and deaths.

Malaria preventive drugs, however, were found effective in reducing malaria cases. Research results showed a very strong relationship. Fewer malaria cases were observed among those who took preventive drugs than those who did not. This means that malaria prevention drugs had a big positive impact in the prevention of malaria.

Council Residual Spraying is also one measure supported by empirical evidence in controlling malaria. Research results indicated big differences in malaria experiences among those whose houses are covered, and those not covered especially in weekly and monthly malaria occurrences. Very few cases of malaria were observed in households under the Residual Council Spraying programme. This means that Council Residual Spraying had significantly reduced the incidence of malaria in cases were they were used.

The Use of ITNs, like awareness programmes, was not supported by the research results as effective in the fight against malaria. Other measures examined, as stated above are those aimed at directly killing mosquitoes. They included the use of Mosquito Coils and spray. These methods proved very effective in reducing malaria cases.

The curative measure was the administration of Coartem. In Zambia, Coartem is the first line drug in the cure of malaria. Despite the respondents reporting poor distribution of the drug, and the high price at which it is being sold, the majority (90%) of the malaria cases were cured using courted, though late due to delays in the diagnosis of the disease.

It must, however, be emphasised that from the tests, based on the analysed data, no intervention was found 100% effective. A combination of different interventions may be necessary to maximise effectiveness.

3.3 RECOMMENDATIONS

Since some of these interventions have shown positive results, there is need to intensify the programmes. Despite the steady reduction in malaria cases, much still needs to be done to eradicate the problem. Malaria prevalence rates and deaths resulting from malaria complications are still notable. It is therefore recommended that government should consider increasing the number of Health Institutions in Kafue. This will help the district to effectively implement, monitor and evaluate the Malaria Control Programme.

3.3.1 Equipping the Health Institutions

Government should equip all Health Institutions in Kafue with modern diagnostic equipment. This will improve malaria diagnosis and treatment. It will also enable the district to have the relevant data base on malaria, which will be useful in the monitoring of the Malaria Control Programmes. Accessories for hanging ITNs (I.e. strings hooks) should be included in the package by the distributors.

3.3.2 Improving the Procurement of Drugs

Government should procure enough, new and effective drugs, like Fansidar and Coartem, to quicken the phasing out of ineffective drugs such as Chloroquine. Most health centres relied on the use of chloroquine which is ineffective.

3.3.3 Harmonising the Pricing of Malaria Drugs

Government should harmonise the pricing of important malaria drugs (Coartem, Fansidar etc) between public and private section in order to benefit the patients. Also the government should strengthen the Drug Logistics Management in order to avoid drug stockouts. This could be done through the adequate funding of health institutions in the area.

3.3.4 Re-orientating the Health Workers

There is need for Government to re-orient health workers in Kafue in the malaria treatment policy change. This could be done through the provision of malaria treatment guidelines and also the holding of seminars in order to update health workers clinical knowledge on how to cure malaria.

3.3.5 Sensitising the Community Members

Government should put in place a deliberate campaign in order to sensitise the general population of the community in the shanty compounds, (Zambia Compound) in Kafue on the available treatment options and importance of adherence to malaria treatment protocols.

3.3.6 Improving the Funding Levels

Government should adequately fund the implementation of IEC Programmes. Government and other Donor Agencies should increase funding towards Malaria Preventive Programmes (MPPs) such as spraying and awareness campaigns.

3.3.7 Putting in Place a National Malaria Policy

Government should put in place a malaria policy, which will be based on the in-depth analysis of malaria and its control in the country. The policy will also serve as a guide in the control of malaria.

3.3.8 Improving the Service Delivery of the Local Council

There is urgent need for the district council to improve its service delivery to the people. The councils should, for instance, construct feeder roads for drainage in compounds to prevent mosquitoes from breeding. The councils should be provided with the reliable transport to enable it to facilitate the distribution of ITNs and the implementation of RIS Programmes. There should be well co-ordinated programmes between Kafue District Council and the NGOs operating in the area in order to avoid parallel programmes.

The Council should co-ordinate with the local political leadership in the implementation of MCPs. There is need for the council to hold consultations with other stakeholders.

3.3.9 Subsidising the Price of ordinary spray and Mosquito Coils

The Government should subsidise the prices of ordinary spray and Mosquito Coils. This measure will result in more people benefiting from the Malaria Control Programmes. At the moment it is difficult to effectively control malaria in shanty compounds because although the dwellers in these areas are more vulnerable to the infection due to poor environmental sanitation, they are so poor that in most cases, they cannot afford to buy ordinary spray or even mosquito coils.

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APPENDIX A

THE EVALUATION OF THE IMPACT OF MALARIA CONTROL IN SHANTY TOWNSHIPS; THE CASE STUDY OF ZAMBIA COMPOUND TOWNSHIP IN KAFUE

SERIAL NO: .....

A. PERSONAL DETAILS

1. ***AGE***

{a} **16-21** ☐ {b} **22-45** ☐

{c} **46-55** ☐ {d} **Above 55** ☐

2. ***SEX***

{a} **Male** ☐ {b} **Female** ☐

3. ***MARITAL STATUS***

{a} **Single** ☐ {b} **Married** ☐

{b} **Widowed** ☐ {d} **Divorced** ☐

4. ***FAMILY SIZE***

{a} 0 - 3 ☐ {b} 4 – 7 ☐

{c} 8 – 12 ☐ {d} Above 13 ☐

5. ***EDUCATIONAL LEVEL***

{a} Primary ☐ {b} Secondary ☐

{c} Tertiary ☐ {d} None ☐

6. ***EMPLOYMENT STATUS***

{a} Employed ☐ {b} Unemployed ☐

{c} Retrenched ☐ {d} Retired ☐

{e} Self employed ☐

B. ***MEASURES TO COMBAT MALARIA***

1. **Do you use insecticide treated bed nets?**

{a} Yes ☐ {b} No ☐

2. If yes how did you acquire them?

{a} Self ☐ {b} Government ☐

{c} NGO ☐ {d} Church ☐

{e} Others ☐

3. Do you use any of the following?

{a} Coils ☐ {b} Spray ☐

{c} Repellants ☐ {d} Others ☐

4. Does the local council /authorities spray the surroundings?

{a} Yes ☐ {b} No ☐

5. Are there any pools of stagnant water in your area?

{a} Yes ☐ {b} No ☐

6. Are you aware of any malaria preventative programmes?

{a} Yes ☐ {b} No ☐

7. If yes, by whom?

{a} Government ☐ (b} Local Authority ☐

{c} NGO s ☐ {d} Church ☐

{e} Others ☐

8. Methods of dissemination

{a} Pamphlets ☐ {b} Videos ☐

{c} Audio/ Verbal ☐ {d} Others ☐

9. Do you take any malaria preventive drugs?

{a} Yes ☐ {b} No ☐

10. If yes, who supplies them?

{a} Council ☐ {b} NGO s ☐

{c} Church ☐ {d} Government ☐

{e} Others ☐

11. Have you or any member of your family suffered from malaria?

{a} Yes ☐ **{b} No** ☐

12 If yes how often?

{a} Weekly ☐ **{b} Monthly** ☐

{c} Yearly ☐

13. Where were you treated?

{a} Home ☐ **{b} Clinic** ☐

{c} Hospital ☐ **{d} Others** ☐

14. What kind of treatment / Drugs did you use?

{a} Chloroquine ☐ **{b} Fansidar** ☐

{c} Coartem ☐ **{d} Quinine drip** ☐

{e} Others ☐

15. **Have you ever lost any member of your family as a result of malaria complications?**

{a} **Yes** ☐ {b} **No** ☐

16. **If yes how many?**.....

17. **Have you ever lost a friend as a result of malaria complications?**

{a} **Yes** ☐ {b} **No** ☐

18. **If yes how many?**.....

APPENDIX B

THE EVALUATION OF THE IMPACT OF MALARIA CONTROL IN SHANTY TOWNSHIPS; THE CASE STUDY OF ZAMBIA COMPOUND TOWNSHIP IN KAFUE

SERIAL NO: .....

LOCAL AUTHORITIES

1. **Do you have any Malaria Preventive Programmes in place?**

   .....

2. **What are they?**

   .....

3. **What constraints do they have?**

   .....

APPENDIX C

THE EVALUATION OF THE IMPACT OF MALARIA CONTROL IN SHANTY TOWNSHIPS; THE CASE STUDY OF ZAMBIA COMPOUND TOWNSHIP IN KAFUE

SERIAL NO: .....

CLINICS

1. **How many Malaria patients have you treated in?**

{a} 2000 ☐ **{b} 2001** ☐

{c} 2002 ☐ **{d} 2003** ☐

{e} 2004 ☐ **{e} 2005** ☐

2. **What drugs were used?** .....

3. **Which drug was effective?** .....

4. **Which group of people are prone to Malaria?**

{a} Children ☐ **{b} Pregnant women** ☐

{c} The old ☐ **{d} Others** ☐

5. **How many people have died from Malaria in:**

{a} **2000** ..... {b} **2001** .....

{c} **2002** ..... {d} **2003** .....

{e} **2004** ..... {f} **2005** .....

2 **Why these deaths since there are drugs; reasons for the death?**

.....

3 **Do they sensitize patients on Malaria prevention?**

.....

4 **Do they have any constraints?**

.....

APPENDIX D

THE EVALUATION OF THE IMPACT OF MALARIA CONTROL IN SHANTY TOWNSHIPS; THE CASE STUDY OF ZAMBIA COMPOUND TOWNSHIP IN KAFUE

POLITICAL LEADERSHIP

1. **Are there any Malaria preventative programmes in their areas?**

   .....

2. **How are they involved?**

   .....

3. **Are there any constraints?**

   .....