

FONDIB MODESTUS NGWA BANDOLO

Heavily Indebted Poor Countries (HIPC)
Initiative in Cameroon and the fight to
reduce malaria related under-five mortality.

ABSTRACT

A review of how the HIPC Initiative has translated in fight against under-5 mortality due to malaria in Cameroon has yet to be presented in published literature despite considerable documentation on HIPC Initiative. This study to a certain degree addresses this gap by reviewing published research, on how the HIPC Initiative has succeeded or failed to reduce under-5 mortality due to malaria in Cameroon, one component of evidence base.

Secondary data form the basis of data collection in this study where published documents, articles, journals of the topic in question were reviewed. Studies were sought via an internet search of Medline database, Google scholar, Wholis database and IMF Survey database. Key areas for search included the following criteria: Insecticide Treated Mosquito Nets (ITNs) distributed by HIPC Initiative targeting under-5 children in Cameroon; percentage of children sleeping under a mosquito net; utilization and coverage of mosquito nets; and statistics on malaria morbidity and mortality in under-5. Studies eligible for the criteria were reviewed, synthesized and included.

Findings show a considerable number of Insecticide Treated Mosquito Nets (ITNs) distributed targeting under-5; a certain percentage of children sleeping under a mosquito net; low utilization and coverage of mosquito nets; and limited statistics on malaria mortality and morbidity in children under-5. That notwithstanding, the following factors were identified to influence the use of ITNs: economy, culture, demography and environmental conditions.

Regardless of the findings identified in this study, data suggest little or an insignificant impact brought about by HIPC Initiative in the fight against under-5 related malaria mortality due to insufficient, lack of well-designed and documentation studies in this area in the published literature. Policy implications of this study include: understanding factors influencing the use of ITNs and demystifying negative perceptions; tracking the progress and drawing inferences on both ownership and actual use of ITNs could encourage a sustained use ITNs in order to optimize their role as malaria control tool. Region-specific rapid assessments of household possession and use of ITNs should be done regularly, under-5 morbidity and mortality data tracked and properly documented. The findings obtained during such an assessment should be incorporated into programme policy.

Key words: HIPC Initiative, under-5 malaria, ITNs, malaria.

ACKNOWLEDGMENTS

Thanking my supervisor, Dr Erika Gubrium for her profound dedication, advice and patience demonstrated in guiding me throughout this study.

I would like to extend my sincere gratitude to all members of the Ngwa Bandolo's family (especially Mbinglo Sheila Veye), relatives, and friends who have contributed to my success. I also want to acknowledge the support and encouragements from Dr Atashili Julius (Lecturer University of Buea, Cameroon), Berka Dintar (Euroclear Bank, Brussels, Belgium) during my studies.

Finally special thanks to my department and institution: Department of Social Work, Child Welfare and Social Policy, HiOA

LIST OF TABLES

TABLE 1: LIST OF COUNTRIES THAT HAVE QUALIFIED FOR, ARE ELIGIBLE OR POTENTIALLY ELIGIBLE AND MAY WISH TO RECEIVE HIPC INITIATIVE ASSISTANCE (AS OF JULY 1, 2010)	17
TABLE 2: CAUSES OF UNDER-FIVE MORTALITY IN CAMEROON 2010.	27
TABLE 3: DISTRIBUTION OF U5MR IN DIFFERENT QUINTILES IN CAMEROON	28
TABLE 4: TOTAL NUMBER OF ITNS DISTRIBUTED 2003-2004.....	31
TABLE 5: CHILDREN UNDER- 5 WITH FEVER BEING TREATED WITH ANTI-MALARIAL DRUGS, PERCENTAGE	37
TABLE 6: CHILDREN UNDER- 5 SLEEPING UNDER INSECTICIDE –TREATED BED-NETS, PERCENTAGE	38

LIST OF FIGURES

FIGURE 1 CONCEPTUAL MODEL –HBM (SOURCE: GLANZ ET AL, 2002, P. 52).....	10
FIGURE 2: SPATIAL LIMITS OF PLASMODIUM FALICPARUM MALARIA TRANSMISSION MAP 2010 IN CAMEROON	26

LIST OF ACRONYMS

ACTs: Artemisinin Based Combination Therapies
AIDs: Acquired Immune Deficiency Syndrome
BMC: Bio Med Central
CCM: Country Coordinating Mechanism
DALYs: Disability Adjusted Life Years
DDT: Didichlorodiphenyltrichloroethane
HIPC: Heavily Indebted Poor Countries
HIV: Human Immunodeficiency Virus
HMB: Health Belief Model
IHME: Institute of Health Metrics and Evaluation
IMF: International Monetary Fund
ITN: Insecticide Treated Net
NIAID: National Institute of Allergy and Infectious Diseases
NMCP: National Malaria Control Programme
OCT: Organizational Change Theory
OMS: organisation Mondiale de la Santé
PRSP: Poverty Reduction Strategy Paper
SCT: Social Cognitive Theory
U5MR: Under -Five Mortality Rate
WB: World Bank
WHO: World Health Organization
Wholis: World Health Organization Library Database

TABLE OF CONTENTS

ABSTRACT	i
ACKNOWLEDGMENTS	ii
LIST OF TABLES	iii
LIST OF FIGURES.....	iii
LIST OF ACRONYMS.....	iv
CHAPTER ONE	1
1.1 INTRODUCTION.....	1
1.2 Background	3
1.3 Aim and research question	6
1.4 Statement of the problem	6
1.5. Structure of the dissertation.....	7
CHAPTER TWO.....	8
2.0. METHOD OF THE STUDY.....	8
2.1. Research design.....	8
2.2. Data collection method and selection of material	8
2.3. Theoretical framework of the study	9
2.3.1. User perspective of the ITNs.....	9
2.3.2. Conceptual Model- HBM.....	9
2.3.3. Institutional response to the ITNs distribution project.....	11
2.4. Limitation of the study	13
CHAPTER THREE.....	14
3.0. REVIEW OF SIGNIFICANT LITERATURE – FINDINGS.....	14
3.1. Introduction	14
3.2. History of the HIPC Initiative	14
3.2.1. Steps to qualify for HIPC Initiative.....	15
3.2.2. Countries receiving debt relief	16
3.3. Malaria - a social burden	18
3.4. Malaria Control: Overview and future standpoint	19
3.4.1. Malaria vector control in Cameroon	20
3.5. Insecticide –treated nets: tool for malaria prevention	22
3.5.1. ITNs use- promotion strategies	23
3.5.2. Ownership –utilization of ITN	24
3.5.3. Determinant of Possession and Use of ITN	24
3.6. Study setting -Cameroon.....	25
3.7. Under-five mortality in Cameroon	27
3.8. The HIPC Initiative- ITNs scale- up	29
3.8.1. ITNs distributed via HIPC scheme.....	30
3.8.2. Perception about use of ITNs, case of Cameroon	31
3.8.3. Environmental factors	33
3.8.4. Applying ITN projects: operational issues and limitations.....	33
3.8.5. ITN debate and controversies.....	34
3.9. Gaps in the health system of Cameroon accounting for poor intervention in fight against malaria.....	36
3.9.1. Insufficient numbers of adequately trained health staff	36
3.9.2. A weak National Health Management Information System	36
3.9.3. Insufficient equipment and necessary logistics.....	38
3.9.4. Insufficient community involvement and participation	38

CHAPTER FOUR 39
4.0. CONCLUSION 39
REFERENCES 40

CHAPTER ONE

1.1 INTRODUCTION

Over a million people who die annually, malaria is the cause. Above 90 percent of such deaths are recorded in sub-Saharan Africa, having serious economic and social costs. Pregnant mothers and their unborn children are particularly vulnerable to the disease. Malaria kills one child every 30 seconds, about 3000 children every day. Those who survive a severe malaria attack, end up suffering from serious mental and physical impairment. It is the leading cause of low birth-weight in newborns, anaemia and infant death during the first four weeks on life (WHO Factsheet No.180).

Malaria stands out as one of the top priority issues in international health (WHO Report, 1999). The World Bank (WB), together with World Health Organization (WHO) also rank malaria as one of the leading causes of lost Disability-Adjusted Life Years (DALYs) in Africa (World Bank 1993). Such a burden presents with an annual loss of 35 million future life years due to disability and premature mortality (Ibid). Annually, 3.3 million people are at risk of malaria. People living in poorest countries are most at risk. In 2010, 90% of deaths occurred in Africa and almost 600 000 Africa children died, most of them under five years of age (WHO 10 Facts on Malaria, 2012). It could be easier to conceptualize the burden malaria is placing on humanity and development; and could be one of the biggest contributors for underdeveloped economic growth.

Such a public menace has for decades been given a favourable consideration to reduce its burden on humanity. According to the Report in the Bureau for Increasing the Use of Quinine, it documents that several major international initiatives have been launched to tackle malaria recommending strategies such as: encouraging use of anti-malarial drugs, insecticide to kill mosquitoes and bed-nets to prevent biting at night. Some prominent of such initiatives include the World Health Organization's Roll Back Malaria Programme, the Multilateral Initiative in Malaria, and the Medicines for Malaria Venture(Bureau for Increasing the Use of Quinine), and HIPC Initiative.

According to Cameroon's Report on Health Sector Strategy 2001-2010, malaria is a major endemic illness and the leading cause of morbidity and mortality in Cameroon. The disease is responsible for 40 - 45% medical consultation, 50% of morbidity and 40% of deaths in

children under five; 30 to 40% of deaths in health institutions; 57% of days in hospital; and 26% of sick leave absences. Yearly, over two million cases are observed by health structures. In addition, the malaria burden has a considerable socio-economic impact. It consumes up to 40% of annual health budget of household. In Cameroon, the disease is annually responsible for 30 - 35% of the total deaths, 35% of childhood mortality and 40 - 45% of morbidity cases. Records presented by Cameroon Ministry of Health show that 41% of the population has at least one episode of malaria yearly, under- 5 children and pregnant women being the most affected (Minsanté Cameroun, 2008).

For over years now, the malaria program in Cameroon has received grants from many international organizations, for example Heavily Indebted Poor Countries (HIPC) Initiative, Global Funds directly implemented by the Ministry of Public Health to fight this endemic disease. Despite resources invested in recent years to control the malaria burden, for example the free distribution of Insecticide Treated Mosquito Nets(ITNs), free consultation and treatment of uncomplicated malaria in children less than five years ; it remains a major public health problem in Cameroon, affecting all regions in the country (Minsanté Cameroun 2008) .

In this study I will limit my focus on the HIPC Initiative, exploring how it has succeeded or failed in reducing malaria related deaths among under -5 children in Cameroon. I could also mention, not in greater details, pregnant women as a target group of the Initiative because documented by Guyatt and Snow (2001), malaria in pregnancy accounts for 5.7% of infant deaths in malarious areas and therefore is an indirect cause of child survival. Malaria causes complications during pregnancy like severe anaemia, and miscarriages, which leads to low birth weight and contributes to neonatal death.

A review of how the HIPC Initiative has translated in fight against under-5 mortality due to malaria in Cameroon has yet to be presented in published literature despite considerable documentation on HIPC Initiative. Malaria has been one of the main killer diseases , affecting under-5 children in Africa and Cameroon for the past decades . Based on the findings presented above, malaria remains a nuisance in Cameroon affecting under- 5 children; a possible hindrance to human capital. My professional experience as a nurse also contributes to the choice of topic. I have experienced the horror of children die because of malaria, which could be prevented. Based on my observation most of ITNs for the HIPC distribution project were not evenly distributed to pregnant mothers; some were stuck in warehouses by the hospital management and sold at higher prices. It could be possible to question coverage and

utilization of the ITNs, and maybe the HIPC Initiative management in achieving desired set goal of reducing under-5 mortality due to malaria via the distribution of free ITNs.

The study is comprised of a retrospective comparison of HIPC's efforts in fighting under-five malaria during and after its implementation in Cameroon. Given the findings at the end of the study, I will explore the issue of gaps between policy intentions and policy implications. This could help to suggest changes in HIPC to best fit the particular context of Cameroon.

1.2 Background

Though not the greatest killer disease in the world today, malaria deaths account for 90% of world's death, and mostly occurring in Africa south of the Sahara (World Health Report, 2002). It is an infectious disease, which could be fatal, caused by a parasite (plasmodium) transmitted from human to human by the bite of infected female Anopheles mosquitoes. Four species of the parasite plasmodium are responsible for malaria in humans: Plasmodium vivax, Plasmodium malariae, Plasmodium ovale, and Plasmodium falciparum. The female Anopheles mosquito becomes infected by ingesting blood containing the sexual forms of the parasite plasmodium. After developing in the mosquito, the plasmodium is inoculated into humans when the mosquito next feeds (bites) (<http://www.healthscout.com/ency/1/347/main.html>). Malaria may also be transmitted through transfusions of infected blood, and from an infected pregnant woman to her unborn child (National Institute of Allergy and Infectious Disease, NIAID, 2000). The clinical manifestation of malaria includes cyclical short periods of fever, headache, muscle and joint pains, nausea, and general malaise. If the condition is not treated, it could result in anaemia, kidney failure, coma, and death. All vertebrates, both human and animal can be infected with malaria parasites (WHO, 1996).

The infection is common in Africa due to the presence of one of the most dangerous of the four human malaria parasites, *Plasmodium falciparum*. Also, there is a wide spread of the malaria parasite, *Anopheles gambiae*, and it is difficult to control. An estimated annual death from malaria sums up to a million and most of these are children under five years of age (World Health Report, 2002).

In the area of Africa, defined by the southern fringes of the Sahara Desert in the north and latitude of about 28° in the south, most people are affected by malaria. Most people at risk of malaria live in areas of relatively stable malaria transmission- infection is common and occurs

with such considerable frequency that this leads to development of certain level of immunity. Young children and women are the highest risk population groups for malaria morbidity and mortality, especially those living in areas of stable malaria transmission. The early years, first or two of life, of most children experiencing malaria infection are particularly dangerous because they have not yet acquired adequate clinical immunity to the malaria parasite. However, if a child survives a malaria episode and is repeatedly bitten by mosquitoes, they gradually develop some resistance to the malaria parasite. On the contrary, adult women living in areas of stable malaria transmission have a high level of immunity, but this is impaired especially during first pregnancy, with the result that risk of malaria increases.

<http://www.againstmalaria.com/downloads/RBMBurdenMalariaAfrica.pdf>).

There exist three principal ways malaria contribute to child mortality. First, an overwhelming acute infection, which frequently presents as seizures or coma (cerebral malaria), may kill the child directly. Second, in the case of repeated malaria infections, it contributes to the development of severe anaemia, which substantially increases risk of death. Third, low birth weight- frequently complication of malaria infection in pregnant women- is the major risk factor for death in the first months of life. Furthermore, repeated episodes of malaria infections in young children is a predisposing factor to other common childhood illnesses , such as diarrhoea, respiratory infections , and thus contribute indirectly to mortality(Africa Malaria Report ,2003).

The report on United Nation News Service notes that for the past decades, there have been a number of global movements to combat malaria. In 2007, for example, the Bill and Malinda Gates Foundation renewed an original call set forth by WHO in 1955, for malaria eradication; in 2011, the UN secretary –General declared a goal of reducing malaria mortality to zero by 2015. Similarly, the Abuja Declaration on Roll Back Malaria 2000, held in Nigeria, targeted to halve malaria –associated morbidity and mortality by 2010 compared with the levels in 2000. Findings from Ravishankar and friends; Institute for Health Metrics and Evaluation (IHME) note an increase in development assistance tackling malaria over the past years, involving millions of dollars, US\$149 million in 2000 to almost \$1.2 billion in 2008, (Ravishankar et al.,2009; IHME,2010) which has led to a rapid scaling up of malaria control in Africa(IHME ,2010;WHO Report 2010). The Joint International Monetary Fund (IMF)-World Bank Initiative launched in 1996, known as HIPC Initiative, made allocations for

beneficiary countries of the initiative to address key health issues including malaria in Sub Saharan Africa, Cameroon inclusive.

The Initiative for Heavily-Indebted Poor Countries (HIPC), for example, is an approach to debt reduction that requires the participation of all creditors—bilateral, multilateral, and commercial. The initiative aims for countries to make debt service burdens manageable, through a mixture of sound policies, generous debt relief, and new inflows of aid. For a country to be eligible, its per capita income must be low enough to qualify for concessional lending from the IMF and World Bank, and it must face an unsustainable debt burden even after traditional debt relief (such as the Paris Club's Naples Terms) (<http://www.imf.org/external/np/exr/ib/2000/092300.htm>).

Report on the International Monetary Factsheet (2010) notes that the launching of the HIPC initiative in 1996 by the IMF and World Bank aimed at ensuring poor countries are not faced with debt burden they cannot manage. Since its creation, the international financial community, including multilateral organizations and governments have been working together to reduce the external debt burdens to sustainable level of the most heavily indebted poor countries. A complete review of the Initiative in 1999 allowed the Fund to provide faster, deeper, and broader debt relief and strengthened the links between debt relief, poverty reduction, and social policies (IMF, 2010).

Debt relief frees up resources for social spending, one of such including aid flows, to address the development needs of low-income countries. To have a reasonable impact on poverty through debt reduction, spending the additional money on programmes that benefit the poor is very important. Before the advent of HIPC Initiative, eligible countries, instead of spending considerably on health and education, priority was given to repayment of debts. The coming of HIPC Initiative has led to mark increase expenditure on health, education and other social services (Ibid). The health sector is expected to benefit a considerable share of the funds provided. The resources provided are important enough in certain countries to make a difference in certain priority programmes that have been neglected or underfunded. Cameroon became eligible and benefited from the HIPC Initiative in 2000 before reaching completion point in 2006. During this period the country has benefited from insecticide treated mosquito nets made available by the HIPC Initiative to fight malaria in under-5 children and pregnant women. Fighting malaria in vulnerable groups therefore could be another strategy of reducing poverty. Such a relief could help beneficiary countries provide or improve basic social services like healthcare, education to the local population.

1.3 Aim and research question

The aim of this study is to determine the impact of the HIPC Initiative in the fight against under-5 mortality due to malaria in Cameroon. In this research I will be addressing the question:

How has the HIPC Initiative succeeded or failed to fight against under-5 children mortality due to malaria in Cameroon?

1.4 Statement of the problem

The prevalence of malaria in Cameroon, especially in children under-5, seems to be on the rise despite the joint efforts by government (for example National Malaria Control Programme, NMCP) and international agencies to reduce the burden. Mvondo (1998), documents that malaria is a major health problem in Cameroon. Children less than five years are most affected (WHO/CAMINFOS, 2002). The Cameroon Poverty Reduction Strategy Paper, 2003 has a strategy, Priority 6: *Building capacity and enhancing human resources*. In this domain, improvement of the general population's health, especially mothers and children is taken into consideration by the government. The National Malaria Control Program (NMCP) in Cameroon for years has been fighting to reduce the malaria burden in Cameroon implementing various strategies like: use of drugs, rapid diagnostic tests and use of ITNs. The country's health policies recommend the use of Insecticide Treated Mosquito nets as one of preventive strategies to fight malaria, especially in children and pregnant women. Since 2003 till date, there has been a scale up of mosquito nets in Cameroon by country's government, HIPC Initiative, Global funds and other donor organization(international and local), but malaria is still problematic. Despite efforts to scale up ITNs use, it is yet to be appreciated if such an effort has translated in curbing malaria in society. This project has existed for years scaling up ITNs use targeting vulnerable groups- under-5 and pregnant women but little there exist insufficient documentation on the follow-up, management, assessment of the ITNs distribution project funded by the HIPC Initiative in Cameroon and how is it has been successful or failed in reducing malaria under-5 mortality.

This research finding could fill up knowledge gaps focusing on changes in under-five mortality and morbidity due to malaria following the distribution of ITNs as preventive measure to fight malaria, sponsored by the HIPC Initiative in Cameroon. The finding could also help the government and stakeholders ascertain the success of the project both at local and national levels. Findings could also serve as a template for future international donors or

organizations sharing similar or like goals with HIPC Initiative encourage use of ITNs a malaria prevention tool.

1.5. Structure of the dissertation

This study will comprise of four chapters followed by references and appendices. The structure has the following as key main sections to be discussed: chapter one comprise of the introduction, background, aims and research question of the study and significance of the study. Chapter two involves the method of the study and theoretical framework.

It reviews the research design or strategy used. Aspects on study design/strategy, data collection methods are discussed; how the material of the work is selected. The next section, chapter three, reviews the significant literature and/or findings relevant to the topic in question. In this same section, it presents the findings and/or results identified. The case study area for the thesis, that is Cameroon, is also addressed in this section. Chapter four ends the dissertation with a conclusion constituting a summary/synthesis of findings and policy implications. There are also possible recommendations of significance to the study in this last chapter.

CHAPTER TWO

2.0. METHOD OF THE STUDY

2.1. Research design

This study is a retrospective comparative analysis of changes brought by HIPC Initiative in the fight against under-five malaria burden in Cameroon. Cameroon became part and benefited from such an initiative in 2000 and finally reached completion point in 2006. Such a comparison is primarily qualitative in nature involving a descriptive analysis and an account of the issues being examined.

2.2. Data collection method and selection of material

The data collection method in this study involved Secondary data or documents. In this study, there was a systematic selection of articles (that is, targeted literature review) related to Heavily Indebted Poor countries (HIPC) using key words like ‘ HIPC funding ’, ‘HIPC initiative Cameroon’, ‘Poverty Reduction Strategy Paper Cameroon’. In addition, other search related to malaria and insecticide mosquito nets include: ‘malaria’, ‘ITNs use in Cameroon’, ‘HIPC and ITNs in Cameroon’, ‘malaria in children less than five’, ‘under five mortality due to malaria’, ‘use of mosquito nets in Cameroon’. The articles included an internet search in the following databases like Google, Google scholar, PubMed or Medline database, Wholis (World Health Organization Library database), and IMF Survey database.

The study’s information is made rich with references from published articles in journals like BMC (BioMed Central) public health, Malaria Journal; published between 1996 -2011. References from unpublished articles/work, newspaper library, policy documents for example Poverty Reduction Strategy Paper, research reports, literature review relating to HIPC initiative, report from the ministry of public health, literature review relating to under -five mortality in Cameroon and the use of mosquito nets, are included. I have also used statistics from United Nation, District Health Service.

Eligible publications were synthesized to extract relevant data. Using data retrieved from different types of studies seek to provide a synthesis of an up-to-date, relevant and key literature regarding the study .A mixture of methods was used – Basic content analysis, document analysis and an aspect of discourse analysis incorporated. In this study, I read articles, publication documents, journals, newspapers on the topic in question; summarized, analyzed the content and identified key issues related to HIPC Initiative, ITNs, under-5 malaria mortality. The targeted literature review was guided by the research question of the

study. The quality of the written material was analyzed by verifying the sources of information.

2.3. Theoretical framework of the study

In this study, two main theories make up the theoretical framework: Health Belief Model (HBM) and Organizational Change theory (OCT). These two frameworks are used in the study because there are two possible approaches to investigate the topic : HBM(user perspective, comprising the recipients of the ITNs) and OCT(institutional response).

2.3.1. User perspective of the ITNs

The Health Belief Model (HBM) differentiates between knowledge and action; that besides knowledge, other intervening facts may present that finally influence the course of action people take (Bandura, 1986). The principles of this model have been applied in a wide broad range of health behaviours and population subjects. Of such variations, three broad areas have been identified and documented by Conner and Norman (1996): 1) Preventive health behaviours, which include health-promoting (for example, diet, and exercise) and health-risk (example smoking) behaviours as well as vaccination and contraceptive practices. 2) Sick role behaviours, which refer to compliance with recommended medical regimens, usually following professional diagnosis of illness. 3) Clinic use, which includes physician visits for a variety of reasons.

The choice of model, Health Belief could also suite the purpose of this study as it is also a health promotion/prevention strategy or programme to fight the spread of malaria in under-5 children living in Cameroon by the HIPC Initiative encouraging the use of ITNs as a malaria prevention tool. In the Figure1.0, conceptualized by Ganz et al.,(2002) , its selection to analyze the prevention pattern of malaria in under-five children is based on previous use to predict a number of health-related behaviours like in engaging in exercise(Langie 1977), child vaccination(Bennett and Smith 1992) and compliance with recommended regimens(Bradley and Kegeles 1987). In addition the model constructs have been found to have a high correlation with health-related behaviours (Janz and Becker 1984).

2.3.2. Conceptual Model- HBM

The Figure1.1 shows conceptual model of HBM including various parameters which could lead to likelihood of a positive health action. A key element in HBM is avoiding negative health behaviour.

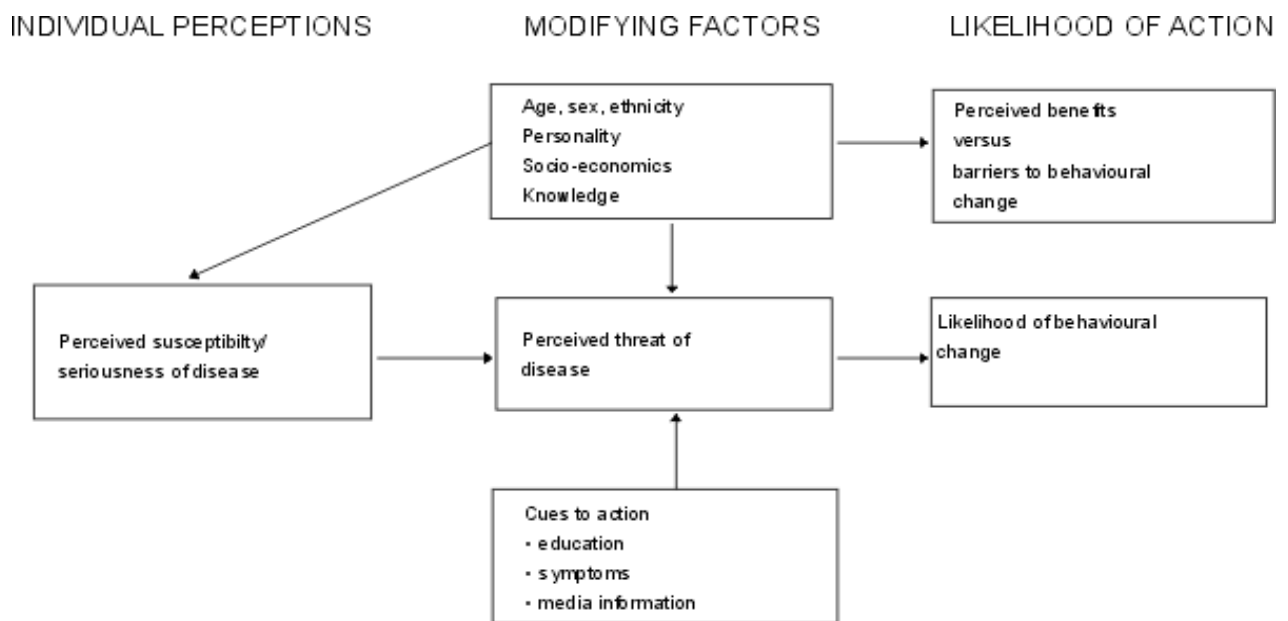


Figure 1 Conceptual Model –HBM (Source: Glanz et al, 2002, p. 52)

HBM has as the underlying concept that health behaviour is determined by personal beliefs or perceptions about the disease and strategies available to decrease its occurrence (Hochbaum, 1958). As presented in fig.1.0, the theory is constructed on six key concepts.

In perceived susceptibility: this is the level, which a person knows his sensitiveness about a disease (Barker, 1994) .People are ready to change their behaviour once they believe they are at risk (Green and Kreuter 1999). Those who do not think, for example, they are at risk of malaria from not sleeping under an Insecticide treated mosquito net, are unlikely to use it.

Perceived severity involves the person’s perception about how serious the disease is (Chamel, 1986). How serious a person considers a consequence determines the probability how he or she will change a health behaviour- described as perceived severity (Green and Kreuter 1999). People are less likely not to use ITNs regularly once they do not experience an immediate and/ or instant health threat if they fail to do so a single night.

Perceived perception is the person’s understanding about the advantage of executing the preventive behaviour (Stein 1992). The Health Belief Model emphasizes the importance of perceived benefits – that the person must perceive the benefits of performing a given behaviour as outweighing the costs (Bandura, 1986). People will use ITNs, for example, if they think it will improve their life some way (Quality- Adjusted Life Years).

The fourth perception in the HBM, Perceived Barriers, explains that most people find it difficult to change their health behaviour. One major reason advanced is that they think it is going to be hard (difficult) - not just physical difficulty but also social difficulty (Green and Kreuter 1999). Each healthy behaviour and practice may meet some barriers and problems.

Households might be in possession of ITNs but have their personal, cultural barriers not using them.

Cues of actions are stimulations, facilitating decision making. Their actions are in two ways: - internal and external; for example, a headache is internal, which makes person to show behaviour of solving it. An external action or out cues to action, could be the mass media, communication between people, helping them to do a special behaviour (Kegeles (1980), Ronis et al.,(1996))

2.3.3. Institutional response to the ITNs distribution project

The HB Model stresses on a personal responsibility, and has as the theoretical basis of a health education programme; but most often a health problem is often more complex or may have other factors over which the individual has personal control, for example economic or environmental factors (<http://www.ohprs.ca/hp101/mod4/module4c15.htm>).

The Organizational Change theory has been resourceful for illustrating: the ways in which organizations function at different levels; how the achievement of organizational change may be achieved through a staged process; and how each stage requires the involvement of different levels within an organization. (<http://www.ohprs.ca/hp101/mod4/module4c15.htm>). Using OCT and HBM (Figure 1.0) can create a stronger health education programme achieving higher quality outcomes. Using such a model, Figure1, HBM, in this study, could help identify several factors that influence or hinder the use of the ITNs and /or the success of the ITNs distribution project. Collection of the findings at a larger scale could be resourceful to policy makers at both local and international level.

Many organizational change theories exist but that which has shown special promise in the area of public health promotion practice (Steckler et al., 2002), and which could be applicable to this study is Stage Theory of Organizational Change. The Stage theory of Organizational Change (Lewin (1951), Zaltman, Duncan and Holbek (1973); and Beyer and Trice (1978)) is used. This theory aids to enlighten how organizations plan and implement new goals, programmes, technologies and ideas. An organization is believed to go through a series of 'stages'; each stage requiring a unique set of strategies if the innovation is to progress.

A four stage model for organizational change exists, as also proposed by Steckler et al., (2002): Awareness (at this stage problems are recognized, and analyzed. The solution to the problems are suggested and evaluated thereafter); Adoption (policies are formulated at this

stage , resources for bringing about the change(s) are allocated); Implementation(the idea or innovation is executed ,reactions take place and changes in roles occur); Institutionalization(the policy or programme becomes an integral part of the organization , and new goals and values are part of its structure). Normally such stages are in sequence but, however, movement could be forward, backward or deserted at any point in the process (<http://msucares.com/health/health/appa1.htm>).

It is also known that at different stages of the organizational change, different actors may play leading roles. At both the awareness and early adoption stages, senior-level administrators tend to be important (<http://msucares.com/health/health/appa1.htm>). For example, raising awareness of the problem of malaria in under-5 children may involve stakeholders, health policy makers at top level become concern about consequences and potential role in preventing such problem.

Mid-level administrators have a tendency to be important at the adoption and early implementation stages (<http://msucares.com/health/health/appa1.htm>). Integrated concepts of OCT and HB model in Figure1.0 give a better appraisal of the problem. For example, the health personnel (District Medical Officer) in the malaria prevention campaign distributing ITNs to vulnerable group, will play a direct role in the adopting and implementing ITNs distribution policy at the health institutions. Workers (nurses, ITNs distribution healthcare personnel) are instrumental at the implementation stage. For example, the successful implementation of anti-malaria policy in under-5 children encouraging ITNs use may require training sessions to increase capacity of healthcare personnel to effectively carryout the project.

Finally, the senior-level administrators once more play a key role during the institutionalization stage (<http://msucares.com/health/health/appa1.htm>). For example, the policy encouraging a free distribution of ITNs to pregnant women and under-5 children could become incorporated at national government health policy in programmes like National Malaria Control.

In summary, the use of the OCT framework in this study helps to make up in areas the HB Model could be lacking behind so as to ensure a better appraisal and design of the health promotion programme suitable in the fight against under-5 malaria mortality via the use of ITNs. As earlier mentioned, some of the nets were not evenly distributed and, even those distributed, there could be lots of questions on the management, utilization and coverage.

Using these theoretical frameworks, help explain how the HIPC Initiative could be operational to achieve its desired goal in the prevention of malaria through the supply of ITNs targeting pregnant women and under-5 children in Cameroon. It should be noted that the application of principles of HBM finding out recipient's perception about malaria and use of ITNs as prevention tool is feasible questioning an informant (a parent, guardian or surrogate mother).

2.4. Limitation of the study

This study has as a main data collection method - Secondary data or documents. The bulk of information presented is internet based and made available by a second party for example institutions, researchers, NGOs. That notwithstanding, secondary information provides a useful background in designing primary data collection or secondary data could serve to identify key questions and issues to be addressed by primary research. Furthermore, secondary data could serve as a baseline with which to primary data collection results.

The information specific to the choice of country in this study is available in insufficient quantities; but I have used examples from other Sub-Saharan Africa Countries who were recipients of the HIPC Initiative and prioritized reducing malaria in under-5 children via promotion of ITNs use, to supplement the literature.

CHAPTER THREE

3.0. REVIEW OF SIGNIFICANT LITERATURE – FINDINGS

3.1. Introduction

In this section of the study, there is the review of significant literature relevant to the topic in question. It addresses issues on the HIPC funding beginning with a brief history, conditions of the project and how it is connected to fight against malaria in under-5 children, a review on malaria-challenges and various control strategies. A discussion on the study country, Cameroon, - malaria situation, prevention methods, under-five mortality, number of children sleeping under mosquito nets is also part of this section. The key malaria preventive strategy recommended by World Health Organization and supported by HIPC Initiative – use of ITNs. Concepts of the Organizational Change Theory and HB Model are also integrated where necessary.

3.2. History of the HIPC Initiative

Most of the poorest developing countries prioritize health the least and most of their public resources are channelled to debt payment. Very small amount of the national budgets in Africa is spent on social services, including health or other needs of the population. Through the enhanced Heavily Indebted Poor Countries (HIPC) Initiative, help with this challenge of debt repayment is being offered by the World Bank (WB) and International Monetary Fund (IMF), (WHO Report on infectious Disease, 2002). The Heavily Indebted Poor Countries (HIPC) Initiative was the first international response to provide comprehensive debt relief to the world's poorest, most heavily –indebted countries. “The idea was that these countries would present a programme of macro-economic reform, along with good fiscal and trade policies, and only then would they qualify for debt relief”, says Shantayanan Devarjan, chief economist of world Bank's Africa Region.

Report on the International Monetary Factsheet (2010); notes that the launching of the HIPC initiative in 1996 by the IMF and World Bank aims at ensuring poor countries are not faced with debt burden it cannot manage. Since its creation, the international financial community, including multilateral organizations and governments have been working together to reduce the external debt burdens to sustainable level of the most heavily indebted poor countries.

A complete review of the Initiative in 1999 allowed the Fund to provide faster, deeper, and broader debt relief and strengthened the links between debt relief, poverty reduction, and social policies (IMF Fact Sheet, 2010).

3.2.1. Steps to qualify for HIPC Initiative

The Report on the IMF Fact sheet (2010), documents that to be eligible for funding from the Initiative, a two step process (decision and completion point) is completed. Countries will have to meet certain criteria: they have to commit to poverty reduction through policy changes and display a good –track record over time. During this time, the Fund and Bank provide interim debt relief in the initial stage, and when the commitments are met by the country, full debt relief is provided.

The first step of the process is known as decision point. For a country to reach decision point the following four conditions must be fulfilled or the country has to demonstrate sufficient progress in meeting them:

- 1) be eligible to borrow from the World Bank’s International Development Agency, which provides interest-free loans and grants to the world’s poorest countries, and from the IMF’s Extended Credit Facility, which provides loans to low-income countries at subsidized rates.
- 2) Face an unsustainable debt burden that cannot be addressed through traditional debt relief mechanisms.
- 3) Have established a track record of reform and sound policies through IMF- and World Bank supported programmes
- 4) Have developed a Poverty Reduction Strategy Paper (PRSP) through a broad-based participatory process in the country.

Once the above conditions are satisfied, the Executive Boards of IMF and World Bank formally decide on its eligibility for debt relief. In addition, there is a commitment to reducing debt to a sustainable level by the international community. During this first stage under HIPC Initiative, referred to as decision point, a country meeting the requirements may begin receiving interim relief on its debt service falling due(IMF Factsheet ,2010).

The second step , known as completion point has the following conditions to be fulfilled , should a country be eligible to receive full and unchangeable debt relief available under the HIPC Initiative, :

- 1) Establish a further track record of good performance under programs supported by loans from the IMF and the World Bank.

- 2) Implement satisfactorily key reforms agreed at the decision point
- 3) Adopt and implement its PRSP for at least one year.

Meeting the above criteria, a country can reach its completion point, allowing it to receive the full debt relief committed at decision point (IMF Fact Sheet, 2010). In the event of receiving assistance, as earlier mentioned, a Poverty Reduction Strategy Paper (PRSP) is drafted. A PRSP contains an assessment of poverty and describes the macroeconomic, structural, and social policies and programs that a country will pursue over several years to promote growth and reduce poverty, as well as external financing needs and the associated sources of financing. The PRSP is prepared by the government, based on a process involving the active participation of civil society, NGOs, donors, and international institutions (IMF, *The Logic of Debt Relief for Poorest Countries*, 2000).

3.2.2. Countries receiving debt relief

Forty countries have been identified eligible or potentially eligible for HIPC Initiative assistance. Of the 40 countries, 30 are receiving full debt relief from IMF and other creditors after reaching completion points. Six countries are on decision points and some are receiving interim debt relief. Four countries, identified as potentially eligible for assistance, are still pending decision points. These countries together with Cameroon were competing for assistance from the HIPC Initiative. The Sub-Saharan Africa countries including Cameroon share similarities in economy, culture, environmental and physical landscape and climatic conditions. The experiences in some of these countries are used to make up for insufficient literature in this study.

Table 1: List of Countries That Have Qualified for, are Eligible or Potentially Eligible and May Wish to Receive HIPC Initiative Assistance (as of July 1, 2010)

Post-Completion-Point Countries (30)		
Afghanistan	The Gambia	Mozambique
Benin	Ghana	Nicaragua
Bolivia	Guyana	Niger
Burkina Faso	Haiti	Rwanda
Burundi	Honduras	São Tomé & Príncipe
Cameroon	Liberia	Senegal
Central African Republic	Madagascar	Sierra Leone
Republic of Congo	Malawi	Tanzania
Democratic Republic of Congo	Mali	Uganda
Ethiopia	Mauritania	Zambia
Interim Countries (Between Decision and Completion Point) (6)		
Chad	Côte d'Ivoire	Guinea Bissau
Comoros	Guinea	Togo
Pre-Decision-Point Countries (4)		
Eritrea	Somalia	
Kyrgyz Republic	Sudan	

Factsheet URL: <http://www.imf.org/external/np/exr/facts/hipc.htm>

The initiative is made up of several dimensions: debt relief/cancellation and structural and social policy reform concentrating particularly on basic health and education provision. The PRSP serves as a working document constituting a framework and a process for linking policy discussions at the macro level, with health systems and community action to reach specific health outcomes. Several countries have selected infectious disease targets and indicators as PRSP core indicators, which will help in government financing of actions to scale up the response. In some sub-Saharan countries, including Cameroon, specific action to prioritize health issues such as control of HIV/AIDS, Tuberculosis and malaria is included in their national poverty reduction and social strategies. In Cameroon, for example, there has been an increase in the percentage of pregnant women sleeping under bed nets (WHO Report on Infectious Disease, 2002). The latter action by Cameroon could be to reduce maternal / child morbidity and mortality due to malaria. It could be interpreted that the fight

against infectious diseases, malaria inclusive, being prioritized in the PRSP is a possible poverty reduction strategy.

The above information provided on the history of HIPC Initiative and how it translated to fighting malaria as a poverty reduction strategy could be applied to the concepts in OCT. At senior-level administration in Joint WB and IMF Initiative, there was awareness of the burden of malaria in most poor countries. These countries neglected basic social services like healthcare and the fight against infectious killer diseases common in these countries like HIV/AIDs, tuberculosis, malaria. Such awareness led to the adoption of policies to fight malaria targeting under-5 children and pregnant mothers by encouraging use of ITNs. These ITNs were to be provided free of charge. With such a policy framework, local governments and other mid-level administrators had as a task to design strategies on how to combat the malaria burden. To be eligible for assistance, the development of Poverty Reduction Strategy paper was a prerequisite. The implementation of such a policy advocated a free distribution of ITNs to pregnant women and under-5 children in Cameroon. This policy was institutionalized in Cameroon becoming one of the policies in National Malaria Control Programme.

3.3. Malaria - a social burden

Despite the number of deaths due to malaria being a burning issue, families and communities are greatly affected. The cost of being ill and/or losing a family member due to malaria could alter the educational, economical and sociological stability of the family or community. If a child is sick, for example, school attendance is affected or people may experience economic losses if sick (WHO, 1998). In addition, the burden of malaria can affect people's decision, both personal and family (children inclusive); that is how they view their ability to learn or save. This means that the disease affects the household's long term income considerably in a significant way that alters educational, economical and social services of household members at a single point in time (Malaney et al., 2004).

The lack of capability to function or poverty may hinder households from spending money needed for malaria treatment, thus risking complications and death. Long term challenges might be difficult for household to shoulder or cope with (Chuma et al., 2006). Children and women living in rural areas are at the greatest risk of death or severe impediment from malaria.

Malaria also *keeps* countries in poverty. Countries with high malaria transmission have shown a history of lower annual economic growth than those without malaria (Sachs and Malaney 2002). Countries with high level of malaria, for example Gabon, Chad, Central African Republic and Cameroon are among the poorest in the world, and typically have very low rates of economic growth; many have experienced outright declines in living standards in the past thirty years. Malaria has played a significant role in the poor economic performance of these countries

(http://www.rbm.who.int/docs/abuja_sachs2.htm). Most poor countries, especially in Sub – Saharan Africa countries have benefitted from the HIPC Initiative- a poverty reduction strategy, where malaria eradication has been prioritized. The initiative encouraged a free distribution insecticide treated bed nets targeting under-5 children and pregnant women.

3.4. Malaria Control: Overview and future standpoint

Large-wide malaria control programs were successful in the past. To achieve the goal of global malaria eradication in matter of years, such an expectation involved environmental control approach using DDT (dichlorodiphenyltrichloroethane), other synthetic insecticides, for example dieldrin and a combination with chloroquine chemotherapy and active case surveillance (WHO, 1999, 53). Despite the fact that such a goal was not achieved, several countries recorded an outstanding decline in the number of malaria cases. An example of such a country is Sri Lanka, where in 1963, recorded a striking success decline in malaria cases from over a million to less than twenty over a year. In addition, other areas with low malaria infectious rates – namely many areas in subtropical areas of Southern Europe, the island settings of Mauritius and Singapore, Hong Kong, part of Malaysia presented with an eradication or control of malaria (WHO 1999, 55). In the late 1960s, then came a technical problem: resistance of malaria vector to DDT and resistance of malaria parasite to commonly used drugs.

In most of the highly endemic areas in sub-Saharan Africa, there is an urgent need to combat malaria, but it has turned out to be challenging or difficult designing an effective malaria control programme. Such has been hard because of the presence of the *Anopheles gambiae* complex, exceedingly effective in the transmission of the disease making it not easy to attain a large reduction in malaria-related mortality by relying only on vector control measures (WHO, 1999, 50). In addition, successful large-scale environmental control programmes and spraying of DDT, and use of other insecticides elsewhere, are expensive and require

developed organizational structures. In most of the endemic malaria areas, there is limited or lack of human, financial and administrative resources required carrying out control programmes (Lengeler et al., 1996, 4)

The WHO Malaria Conference in Amsterdam, 1992, gave a new way forward to malaria control efforts, approving a revised Global Malaria Control Strategy (WHO, 1993). Four basic elements for malaria control made up the strategy, to include the following: Early diagnosis and prompt treatment; Implementation of selective, sustainable, preventive measures including vector control; Early detection, containment, and prevention of epidemics; and fostering regular assessment of affected countries' malaria situation, especially the ecological, social and economic determinants of the disease, by strengthening local capacities for basic and applied research.

Even though there is some resistance of malaria parasite to commonly used malaria drugs, for example Chloroquine, early diagnosis and prompt treatment remain basis for malaria control (WHO 1997, 272). The Tropical Disease Research (1997) notes that despite the failure to attain global malaria eradication, malaria vaccine has not yet developed to successfully curb the disease; there is an increasing effort to improve molecular techniques for immunological research that will contribute to malaria vaccine development (Tropical Disease Research 1997). In addition, new drug search is still going. Lately, the world has reverted to an age old method of preventing malaria or reducing its morbidity and mortality. According to Lengeler (2004), the use of mosquito net in combination with indoor residual (house) spraying (IRS) is highly recommended as a tool for malaria prevention.

3.4.1. Malaria vector control in Cameroon

According to a study on Malaria control vector in Cameroon: past, present and future, Carnevale and Mouchet (2001), document that, especially in Sothern and Northern parts of Cameroon, large scale malaria vector control projects based upon house spraying were implemented in the 50s. All was done in line of malaria eradication concept. In the study, the south, pilot zone of Yaoundé gathered about 150, 000 inhabitants, in the forest area. The first operation dates back to 1953 and went operational in 1956 involving the use of DDT in one part of the country and another, the use of dieldrin. Yaoundé, for example was not treated because it was free of anopheles and malaria. House spraying in the pilot area was a complete success and recorded a plasmodic index drop below 1 %. The southern treated areas recorded successes but unfortunately dieldrin resistance by *Anopheles gambiae* disrupted the

programme which ended in 1960. The northern pilot project was made up of 250,000 inhabitants around Maroua, in savannah areas. To avoid possible resistance of dieldrin earlier experienced in 1956, DDT was selected for house spraying to begin in 1959. From an operational point of view, the project could be considered successful but two years later, the plasmodic index remained constant around same value of 35% and programme came to a halt. It was observed at the time that based on the available technique to fight spread of malaria vector, coupled with the use of chemoprophylaxis (chloroquin + pyrimethamin), the ultimate goal of eradication was not possible. The comparison between south (= success) and north (= failure) was very interesting as it underlined the big differences between epidemiological faces, an unaccepted concept at that time.

Lately ecological and epidemiological diversity could contribute to this challenge. The findings of this study also underlined the need of diversity of strategies according to the epidemiology of the disease and the ecology of its vector. In the 80s, Primary Health Care was promoted and there was a shift from vector to parasite control. The vector control remains as a prevention method. Despite such a shift, chemo-resistance of *plasmodium falciparum* became problematic and was experienced across the country. New emphasis of vector control has developed over time encouraging the use of insecticide impregnated mosquito nets. Two kinds of studies were carried out to find mosquito control at family level, taking into consideration the main reason, costs involved and the current use of mosquito nets. The second part of the study was designed to assess the efficacy of pyrethroid treated mosquito nets in different areas of the southern forested areas against different vectors: *Anopheles gambiae*, *Anopheles nili*, *Anopheles moucheti*. Findings revealed that the use pyrethroid treated mosquito nets was successful in reducing malaria transmission and morbidity sharply, but presented a poor use in Yaoundé (1 mosquito net for 27 "beds") while in Douala, where IMN are largely used against the bite of the huge population of *Culex quinquefasciatus*. The impregnated mosquito nets seem to a tool of great efficacy but their sustainability is still a matter of concern. Promotional campaigns must be developed involving private and public, political and scientific spheres. The general population should be encouraged to actively participate as actors of vector and malaria control at household level (Carnevale and Mouchet, 2001).

3.5. Insecticide –treated nets: tool for malaria prevention

An insecticide-treated net is a mosquito net that repels disables and/or kills mosquitoes coming into contact with insecticide on the netting material. There are two categories of ITNs: conventionally treated nets and long-lasting insecticidal nets:

A conventionally treated net is a mosquito net that has been treated by dipping in a WHO-recommended insecticide. To ensure its continued insecticidal effect, the net should be re-treated after three washes, or at least once a year.

A long-lasting insecticidal net is a factory-treated mosquito net made with netting material that has insecticide incorporated within or bound around the fibers. The net must retain its effective biological activity without re-treatment for at least 20 WHO standard washes under laboratory conditions and three years of recommended use under field conditions.

(<http://www.who.int/malaria/publications/atoz/itnspaperfinal.pdf>)

Ideally, there is a complete physical barrier provided by an untreated mosquito-net to mosquitoes. Such a net, intact, tucked, in practice offers partial protection; mosquitoes easily feed on body parts touching the net or unintentionally left uncovered. This is a juncture where insecticide –treated mosquito nets (ITNs) could make a big difference.

Many studies demonstrate the efficacy of Pyrethroids noting that in addition to their function of killing insects, they inhibit feeding, drive mosquitoes and other insects from hideouts (Lines, 1996, 16). Mosquitoes are less likely to feed through the fabrics or penetrate small gaps of pyrethroid- treated nets (Lines 1996, 17). The research suggests a possible valuable potential ITNs have in malaria endemic zones. Such a technology is simple and can be conducted at local level by non-specialist (Lengeler et al., 1996, 6); knowledge about mosquito nets and insecticides is not foreign in the tropics (Lines, 1996, 17) and finally studies have demonstrated ITNs contribution in giving a facelift to malaria burden.

The completion and publication of results of the following trials to assess the health impact of insecticide-treated bed nets in some malaria zones in Africa; The Gambia (Alonso et al., 1991), Ghana (Binka et al., 1996), the Kenyan coast (Nevill et al., 1996), and Burkina Faso (Hablutetzl et al., 1997) mark the start of randomized controlled trials. For every 1,000 children protected under bed-nets, it estimates six lives to be saved; translating to approximately 335,000 malaria deaths prevented if every child slept under ITNs (Lengeler, 2003). There could be a decrease in the demand for new drugs and a reduction in spread of drug resistance if there is successful malaria prevention using ITNs (WHO, 1999).

3.5.1. ITNs use- promotion strategies

When addressing the implementation strategies of ITN programmes, two key issues are addressed: questions on how nets are distributed and re-treated; secondly sources of finance for the project. A top-down approach has traditionally been implemented or used for the distribution of mosquito nets in the community (Feilden 1996, 58). The awareness and implementation stages of the OCT could be applied in the context of HIPC Initiative and fight against malaria in under-5 where top level stakeholders(HIPC Initiative) identified the malaria burden executing a top-down approach informing middle and low level administrators the specific strategy to fight malaria- free distribution of ITNs.

That notwithstanding, attempts are being made to involve the community at different levels such as the planning meetings, provide information about treated nets and insecticides, objectives of the intervention and programmes implementation (Feilden 1996, 58). The goals of such could be to encourage a level of community participation for the success of the project. For example, according to the Cameroon Poverty Reduction Strategy Paper Implementation Progress Report (2004), a team of journalists, sociologists and communicators organized an emergency media plan to publicizing the distribution of treated mosquito nets to pregnant mothers organized by government (Cameroon, PRSP, 2004). In 2011, a massive campaign was launched in Cameroon by the Minister of Public Health, on the free distribution of treated mosquito nets to pregnant mothers in all 10 administrative regions in the country. Such a project was managed by medics and security officers to ensure a maximum coverage of the national territory (Malaria World, 2011).The latter examples could be linked to ‘cues of action’ in Figure 1.0, HBM.

With respect to source of financing trial projects, most have been sponsored by donor agencies. When talking about efficacy trials, ‘best case’ situation are expected, requiring free distribution of nets, free insecticide treatment and an intensive interpersonal promotion (Zimicki 1996, 111). Snow and friends note that the expectation makes approaches expensive and labour intensive for integration into national and local control programmes (Snow et al., 1999, 16). In most of the poorest developing countries, especially Sub Saharan Africa, financial crises strongly constrains the budget making it difficult for most of the governments to provide basic health care services to the population, let alone preventive interventions. Most of the governments divert funds to debt repayment, with less priority on health care. The Human Development Report (2002) from the United Nations Development Programme (UNDP) shows that, among 50 African countries, at least 29 recently spent more on debt service than on health. Some of these countries, for example Cameroon, Ghana, Tanzania,

Uganda been have part of debt relief schemes sponsored by the World Bank- IMF Initiative- a poverty reduction strategy .

3.5.2. Ownership –utilization of ITN

The net ownership of ITN could give an estimate of how malaria prevention is implemented, but should be noted it could be an initial step in combating malaria in endemic zones. The use of ITN represents a vital practice together with an epidemiological impact on the disease. It is noted by the ‘*2001-2010 United Nations Decades to Roll Back Malaria*’ Report that even though malaria indicators vary among country, there are five important selected global indicators: malaria death rate constituting both possible and confirmed cases, among target groups for example under-five and other target groups; total number of malaria cases –severe and uncomplicated among target groups; the percentage of households in possession of at least one treated bed net; fraction of patients with uncomplicated malaria receiving appropriate treatment at health facility and community levels, based on national guidelines , within 24 hours of onset of symptoms; and percentage of health facilities reporting availability of stock anti-malaria drugs, as specified by the national drug policy, for more than a week during the last three months.

These indicators of the Roll Back Malaria project existed at the time HIPC initiative went operational. Differentiating the households’ possession of nets and those that utilize them, in children under-five are seen as important indicators in the RBM (RBM Framework, 2000). The use of ITNs is prioritized in Cameroon PRSP (2000). The distinction between possession and use is central if an ITN scaling up initiative is to be effective. Households may report possession of an ITN, but such a project could be insignificant or meaningless if the nets are not utilized regularly especially during peak transmission seasons. Regardless of the fact that is important for national programmes to facilitate households possess ITNs, for control and prevention and an effective management of malaria, little is said about the likely epidemiological impact of such an intervention (Macintyre, 2006).

3.5.3. Determinant of Possession and Use of ITN

Many studies have been carried out worldwide on the factors influencing the possession and use of ITNs. Some examples include studies carried out by Macintyre et al., (2006), Belay (2008), Korenromp et al., (2003). In most of the studies reviewed, determinants vary from country to country depending on their socio-economic and socio-demographic characteristics.

When assessing the impact of ITN distribution programme, the possession and eventual utilization are two aspects which usually contradict. Although cost and other cultural beliefs have been identified to impair possession, utilization has been found to be influenced by different seasons of the year, ethnicity, and gender, alongside some demographic characteristics such as age, education, size of household which also add to the difficulties in satisfaction with the nets by virtue of its size, vividness and form.

3.6. Study setting -Cameroon

According to report in Central Intelligence Agency (CIA) World Fact Book, 2012, Cameroon has an estimated population of 20,129,878 (July 2012 estimate.) Such an estimation takes into account the effects of excess mortality due to AIDS; this can result in lower life expectancy, higher infant mortality and death rates, lower population and growth rates, and changes in the distribution of population by age and sex than would otherwise be expected. The country occupies 58th position in world classification of total population size.

Cameroon's geographical location accounts for existence of malaria in the country. The country has diverse vegetation and topological landforms. Its natural environment cuts across three ecological and epidemiological zones. The zones include: the equatorial region, where there is an annual endemic malaria transmission; guinea savannah or tropical region which has a seasonal transmission between three – six months yearly; and the Sahel savannah has a less than three months transmission of malaria. The zones are 95% endemic to malaria (Edmondson, 2001). Previous studies in Cameroon have shown a great variation in the intensity and transmission of malaria; and vector species. Such a variation occurs between eco-zones of the country; from perennial transmission in the southern forested regions to seasonal and unstable transmission in the northern Sudano-savannah and Sahelian savannah regions (Antonio-Nkonjio et al., 2006; Njan-Nloga et al., 1993).

Fig 2.0 shows spatial limits of *Plasmodium falciparum* malaria transmission map in 2010 in Cameroon, which has been noted as one of common and virulent species in Cameroon. Endemic areas are defined as 'areas with significant annual transmission, be it seasonal or perennial'. Epidemic areas are defined as 'areas prone to distinct inter-annual variation, in some years with no transmission taking place at all' (Snow et al. 1999).

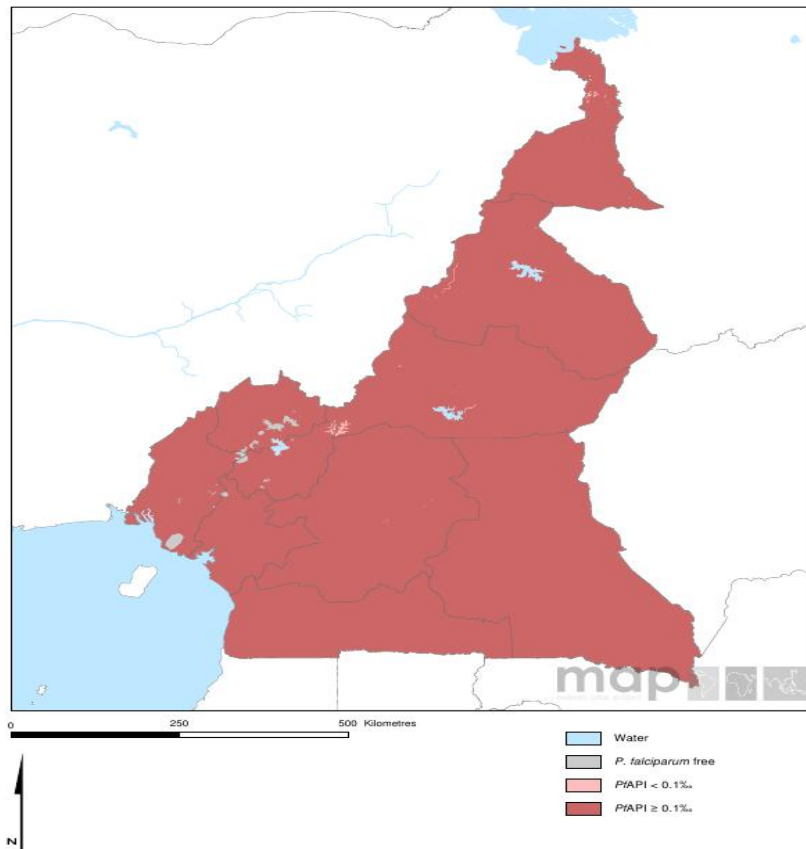


Figure 2: Spatial limits of Plasmodium falciparum malaria transmission map 2010 in Cameroon

The risk-free areas on the map are those shown in light grey. This classification arises because either health system surveillance data (annual case incidence) reported zero cases for three consecutive years, due to low temperature or high aridity are likely to preclude transmission, or because specific medical intelligence exists for the area defining it as risk free.

The section or areas shown in light pink constitute those at risk of those of unstable malaria transmission. These areas where local transmission cannot be ruled out, but levels of risk are extremely low, with yearly case incidence reported at less than 1 per 10,000.

The areas in red are those at risk of stable malaria transmission. This is a very broad classification of risk including any regions where the annual case incidence is likely to exceed 1per10,000(http://www.map.ox.ac.uk/browse-resources/transmission-limits/Pf_limits/CMR/).

Cameroon's geographical location accounts for existence of malaria in the country. The country has diverse vegetation and topological landforms. Its natural environment cuts across three ecological and epidemiological zones. The zones include: the equatorial region, where there is an annual endemic malaria transmission; savannah or tropical region which has a seasonal transmission between three-six months yearly; and the Sahel savannah has a less than three months transmission of malaria. The zones are 95% endemic to malaria

(Edmondson, 2001). Previous studies in Cameroon have shown a great variation in the intensity and transmission of malaria; and vector species. Such a variation occurs between eco-zones of the country; from perennial transmission in the southern forested regions to seasonal and unstable transmission in the northern Sudano-savannah and Sahelian savannah regions (Antonio-Nkonjio et al., 2006; Njan-Nloga et al., 1993).

3.7. Under-five mortality in Cameroon

Under-5 mortality is the probability of a child born in a specific year or period dying before reaching the age of five, if subject to age-specific mortality rates of that period. Under-5 mortality rate is strictly speaking, not a rate (that is, the number of deaths divided by the number of population at risk during a certain period of time) but a probability of death derived from a life table and expressed as rate per 1,000 live births.

(<http://www.who.int/healthinfo/statistics/indunder5mortality/en/>)

Various causes are responsible for the trend in U5MR. Table 2 shows the causes and percentage distribution specific to Cameroon. Neonatal deaths account for 25% of all child deaths, Malaria stands at 19% (IMF 2003, 2010).

Table 2: Causes of under-five mortality in Cameroon 2010.

Disease	Proportion (%)
Neonatal causes	25
Malaria	19
Diarrhoea	16
Pneumonia	16
HIV/AIDS	5
Injuries	2
Other	17

Source: WHO CHERG, 2010 in Bhutta et al, 2010

Poverty accounts for the high U5MR in Cameroon and are a barrier to health care. This is because poor families are unable to access basic health care for their children. The national proportion of people living below the poverty line has stagnated at 40% between 2001 and 2007(IMF, 2010). Fifty-five percent of rural households are poor compared to 12 percent of urban households-and almost 94% of the poor live in rural areas, whereas 2% live in urban areas. Furthermore, nearly 70% of the poorest urban inhabitants have no access to public

utilities or basic services (World Bank, 2010). The costs involved in health care such as user fees, drugs, and transport to the health facility do not favour the poor. So, many people present at the health facility as a last resort, when the child is in extremis too late for treatment (Mulholland et al, 2008).

The table below (Table 3) shows the U5MR for the lowest and the highest quintiles in Cameroon

Table 3: Distribution of U5MR in different quintiles in Cameroon

	U5MR	U5MR	Ratio
Wealth/Assets Quintile	Lowest: 189	Highest: 88	2:1
Sex	Males: 154	Females: 141	1:1
Urban/Rural	Rural: 169	Urban: 119	4:1
Mother's Education Quintile	None: 163	High: 93	2:0

Source: DHS, 2004 in WHO, 2006

The data shows clear inequities in U5MR between the urban and rural quintiles. U5MR is highest in the lowest wealth/asset quintile and lowest in the highest wealth/asset quintile (ratio is 2:1). U5MR is higher in the rural areas than in the urban areas (4:1). There is no difference in U5MR among males and females (1:1). However, U5MR is highest in the non maternal education quintile and lowest in the high maternal education quintile (2:0). Maternal education has a strong impact on child survival (Cleland and van Ginnekan, 1988). Mothers who are educated (modifying factors, Figure 1.0 HBM) will be able to identify symptoms of childhood disease and to seek appropriate and timely interventions. Lack of maternal education explains the high U5MR in the countryside as compared to urban areas. The low status of women in Cameroon as well as their weak decision making power contributes to high U5MR. In some cultures, women are locked out of the decision making process regarding household income and other resources. Therefore, their children are likely to receive less food, and be denied essential health services (UNFPA, 2009; UNICEF, 2007).

According to Organisation Mondiale de la Santé (OMS), (2009), regional disparities exist among U5MR, which is highest in the East (111/1000) and North (106/1000). Defo (1994, 1999) has identified that, infant mortality in Cameroon is highest among children whose mothers are unmarried, traditionalists or are in polygamous unions and in overcrowded households. Cultural factors contribute to child mortality. U5MR is highest among Muslim women who abstain only 40 days after delivery (Mback and Mbodj, 1990). This confirms an

earlier study by Hobcraft et al., (1985) that, poor child spacing is linked to decreased survival chances. Recognition of the signs and symptoms of childhood illness is determined by cultural perceptions (see figure 1.0, HBM) of the illness and exposure to public health messages on the subject. Families may fail to access care for their children because they perceive rightly or wrongly that they will not be well treated in the hospital (Stoneman and Taylor, 2007, as cited by Mulholland et al, 2008).

Geographical inaccessibility to the health facility increases child mortality (Mulholland et al, 2008). Poor quality health services, ignorance concerning the signs and symptoms of early childhood diseases greatly affects child mortality in the country since parents may not identify symptoms of childhood disease (Ibid, 2008). Disparities exist in the distribution of resources. The proportion of people having access to safe drinking water is higher (86.2%) in urban areas than in rural areas (31.3%). The proportion of people using good sanitation system has increased from 8.5% in 2001 to 31.7% in 2007 (IMF, 2010). Lack of safe water and sanitation in most areas of the country has led to childhood deaths from diarrhoea, malaria and measles.

3.8. The HIPC Initiative- ITNs scale- up

According to the Progress Report, PRSP, Cameroon (2004), free distribution of ITNs to pregnant women was done during prenatal consultations in private and non-profit health centres, district, provincial and central hospitals. In addition to the distribution areas, ten Non-Governmental Organizations (NGOs) and associations were selected to promote ITNs use. Such a promotional event was attended by minister of Health and covered on national television and radio stations - this strategy is in line with 'cue of action' in Figure 1.0, HBM.

The local newspaper, Cameroon Tribune, October edition, 2005 notes that malaria burden is a menace in Cameroon. Faced with the challenge of curbing malaria, the government, with support of partners encourages the use of insecticide treated mosquito nets as a way-forward to preventing malaria (- see Awareness, Adoption and Implementation in OCT, Steckler et al., 2002). Such a project has been sponsored by international parties like HIPC Initiative, Global Funds. The HIPC funds permitted the acquisition of 900,000 ITNs for children less than five years, of which 250,000 distributed that same year and rest completed by January 2006. In addition 100,000 bed-nets were distributed to children in kindergartens, thanks to finance from the Global funds (Dr. Okalla Raphael, Permanent Secretary of the National Roll Back Malaria Committee, 2005). In the same local newspaper, Cameroon tribune, only 0.2 per cent of under- five children had access to mosquito nets in Cameroon. Research findings published

by National Malaria Control Programme (NMCP) in Cameroon; indicated 0.06 per cent of malaria morbidity among children less than five years. In mid 1990s, the government of Cameroon lost about 4,227 million dollars within a period of 15 years in malaria.

A local newspaper AfricaNews, June 2011 edition, notes that the government of Cameroon is working hard to reduce malaria burden in Cameroon, which has persistently upheld its status as one of the leading killer diseases. Over eight million treated mosquito nets were distributed by end of August 2011 in the malaria-endemic Central African nation which is home to 20 million inhabitants. This distribution took place post government decision in February 2011 to render free treatment of uncomplicated malaria in children below five years. It adds to reduce cost of ACTs (artemisinin based combination therapies) as well as free treatment for pregnant women (AfricaNews, 2011). Such a decision comes years after Cameroon had reached HIPC Initiative completion point. A time there could be expectation of an outstanding progress in meeting conditions of HIPC initiative and objectives of Poverty Reduction Strategy Paper; marked positive changes in the under- five mortality due to malaria in Cameroon. This could mean there is still a high malaria morbidity and mortality in Cameroon irrespective of the various preventive strategies to control malaria. It could also imply that the HIPC Initiative was not successful reducing under -5 mortality due to malaria.

3.8.1. ITNs distributed via HIPC scheme

Funding from the HIPC Initiative ensured a free distribution of mosquito nets, tax abolishment and tariffs on mosquito net assisting Cameroon government in malaria control (see ‘cues for action’, Figure 1.0, HBM). In Cameroon, purchasing a mosquito net is costly; for example the cost at a private pharmacy ranges between 7,000 and 10,000 CFA frs (US\$ 15-\$20), depending on the size. Such assistance from HIPC funding in scaling up ITNs supply could be seen as a gesture to benefit Cameroonians in preventing malaria but cannot afford. Between 2003 and 2004, a total of 810,000 ITNs were distributed, but findings in 2005 showed only 0.2 per cent of target children and 0.8 per cent of pregnant women had access to those nets. Millions of patients, mostly in rural areas, are yet to gain access to the material (Cameroon Tribune, November edition, 2005).

The HIPC Initiative in the fight against malaria could be questioned in Cameroon based on the available data presented in this study. Report on the ITN Social Marketing in Cameroon (2004) note an inadequate statistical monitoring of the distribution of mosquito nets in Cameroon. Table 4 shows the number of mosquito nets made available by HIPC Initiative in

the years 2003 and 2004. It is documented that over 800,000 nets were ordered. The report notes an insufficient number of nets in various regions of Cameroon, also questioning the treatment procedure.

Table 4: Total number of ITNs distributed 2003-2004

Year	Total No. of ITNs	Distribution method	Target population	Treatment method
2003	157,000	Free	Pregnant women	tablets
2004	678,000	Free	Pregnant women	Liquid

Source: ITN Social Marketing in Cameroon (2004)

From Table 4, it could imply that the total number of nets was not enough and also there has been a problem with statistical documentation. In this finding, there is no information on how the ITNs in 2004 were distributed and treated in the country. How ITNs are treated could equally have an impact on their efficacy and efficiency. In such a report, for example, the total number of ITNs left to make the over 800,000 is not documented, and equally inquiring how the nets are to be treated. Janssen (2005) documents a key constraint to a large –scale, sustainable use of ITNs is the need for a regular re-treatment, which most often is every six months. It should be noted also that they lose efficacy after three washes. This implies that, an ITN not re-treated fast becomes untreated. Such an untreated net does not constitute a good intervention. It is important building a re-treatment strategy programme rapidly; else such a distribution will have no lasting value. However, successful strategies for re-impregnation of ITNs have proved not so easy to make out. In Kenya, for example, a free-house- to house strategy achieved an over 95% re-impregnation, but the success rate went down to 65% when the strategy was changed to a free re-impregnation at look out sites (Ibid). In the case of Cameroon, the PRSP does not explain how such a retreatment is being done; whether the recipients have to go to distribution sites for retreatment or there is a house-to-house check and re-treatment by the ITN promotional team.

3.8.2. Perception about use of ITNs, case of Cameroon

Report in the newspaper, Africa News, June edition, 2011, make out that 20 million ITNs were distributed between 2006 and 2010 by the ministry of public health, Cameroon. Officials report some reluctance experienced during the distribution process. Some people rejected the offer on the grounds that sleeping under nets gives them a feeling of lying in tombs. Elsewhere rumour held that ITNs provoked miscarriages in pregnant women. In some cases, the nets were redesigned and used for fishing, while others transformed them into wedding

gowns (www.africanews.com/site/cameroon). It could be very challenging for a target group to use ITNs if the health promotion intervention is not in line with cultural norms. In such a community, there is a very high probability that pregnant woman or nursing mothers would not sleep under a mosquito net for fear of a spontaneous abortion or a feeling lying in the tombs (see modifying factors, Figure 1.0, HBM)

The use of ITNs in Cameroon has been ongoing for years now. Its use has greatly been promoted by mass campaign, and advertised through audiovisual networks and newspapers. This could explain the increased use of ITNs compared to previous years (Etang et al., 2007). In addition to promotion campaigns, over 2 million ITNs have been freely distributed to pregnant women and children under-five years across the country, Cameroon. However, irrespective of the increased ownership of ITNs, a decrease in malaria transmission or morbidity is still to be appreciated (Minsante, 2010, 35). This could suggest that ownership of the ITNs has not augmented utilization. This could be linked to reasons obtained in findings from previous studies carried out on the continent, such as: social behaviours of communities, size and type of the house, level of education, ethnicity, seasons, and frequency of retreatment of nets (Eisele et al., 2009; Toe et al., 2009; Atieli et al 2011). A 50% reduction rate in malaria transmission and subsequent morbidity and mortality can be achieved when ITNs are properly used (D'Alessandro et al., 1995; Nevill et al, 1996).

Findings from the study carried out by Ndo et al.,(2011) to assess the knowledge , attitude and management of malaria in households living in two cities (Douala and Yaoundé) in Cameroon; reveal a high awareness of populations on malaria and ITNs. Despite the high awareness, there is a low utilization of ITNs for malaria prevention. Some of the factors hindering the use of mosquito nets experienced by families include the following: difficulty in finding chemicals for retreatment of nets; insufficient financial means to buy new nets and replace old ones; limited finance to purchase nets for everyone in the house (see modifying factors, Fig 1.0 HBM); and the sensation of feeling excessive heat when sleeping under a mosquito net. The population of Cameroon is distributed in different housing conditions, for example in camps, single homes. According to Janssen (2005), effectiveness and re-treatment nets may pose particular problem, especially in under camp conditions. Nets may easily be torn or damaged, and so lose their protective effect. Ensuring a re-treatment every six months may also be difficult. Some housing or shelter conditions may not accommodate ITNs and could be too small to shoulder the mounting of ITNs.

The use of nets must be culturally appropriate and accepted. The use of nets is not only limited to the protection against insects, sometimes, they are used to provide privacy, warmth and protection against wind and dust (Janssen, 2005). The Report in the newspaper, Africa News, June edition, 2011 notes challenges in distribution of mosquito nets in some communities in Cameroon. People rejected the offer made to them by ITNs distribution team advancing cultural norms and customs. In most of these communities, curtains, similar to ITNs are used on corpses during funerals; so these people have the feeling of sleeping in the tomb when using the ITNs. With such a belief, it could be difficult for people to sleep under mosquito nets even if they accept the free offer from the donor.

3.8.3. Environmental factors

Furthermore findings reveal that people complain of heat when sleeping under ITNs. This could mean that during the dry season, there could be less number of people using the mosquito nets and more during the raining season when places are cold. It could also be difficult to use these nets in overcrowded homes where sleeping position may be a big problem. The finds in this study is in line with the work of Alaii and friends who document that people use ITNs only when weather is cool, that is, during the rainy season (Alaii et al., 2003). Many individuals could be at risk of malaria infection outside rainy season. HBM has little or no control on environmental factors but findings could programme designers seek lasting solution.

3.8.4. Applying ITN projects: operational issues and limitations

Korenromp et al., (2003) document that even though households may report possession of ITNs, if the net is not at least mounted during periods of peak transmission seasons, its efficacy maybe zero. Possession could be an important indicator for managers but it does not say much about the likely epidemiological impact of the programme. Studies have shown possession of ITNs ranging from 0.1 % and 28.5%, while use among children less than five years old range between 0 % and 16%. Factors accounting for the disparity could be: rationing of ITNs as a result of limited number of nets than members or nets in a household; issues related to local understanding of transmission and how mosquito is avoided (Ibid).

Socioeconomic factors such as wealth, access to health care and education have been shown to be vital predictors to ITN possession and usage (Winch et al., 1997; Schellenberg et al., 2001; Heggenhougen et al., 2003). Ethnicity is also taken into consideration as an important

factor. Nomadic and semi-nomadic lifestyle people are less likely to possess and use an ITN as compared to settled agricultural communities (Bradley et al., 1986; McCormack and Snow 1986; Aikins et al., 1993; Thomas et al., 1996).

The extremely poor populations are at most risk from malaria. The cost of each illness incident costs substantial family resources. There is also an additional problem if malaria affects bread winners (men or women of the household). Such a disease therefore has huge poverty implications making a forceful argument in support of overall public-sector support for treated nets under normal conditions, with special importance on protecting pregnant women and young children (Janssen 2005). Cameroon, despite its relatively diverse economy-agriculture, oil, mining and other natural resources, the country still faces problems common in low income countries such as stagnant per capita income, uneven distribution of income, top heavy civil crisis, endemic corruption and a general unfavourable climate for business enterprise (Central Intelligence Agency, CIA, World Factbook, 2012). From 2001-2007, the poverty rate in Cameroon stood still at close to 40 percent. Fifty five percent of the rural households are poor compared with 12 percent of urban households. About 87 percent of the poor reside in rural area. Such a data illustrate the large economic and socioeconomic disparities present in Cameroon (World Bank Report, 2012). A country experiencing this economic inequality could be difficult for poor households to purchase a mosquito net, or even pay for basic health services. According to Janssen (2005), mosquito nets should obviously be given free of charge.

The ITNs provided by the HIPC Initiative to Cameroon had as a goal to be distributed free of charge so there could be a maximum coverage of the target population, that is pregnant women and under-5 children. The strategy could be good to address an emergency situation at that time but what becomes of a long term outcome? What happens when such a funding comes to an end in a country where majority of the population live in poverty?

3.8.5. ITN debate and controversies

"The regular use of insecticide-treated nets (ITNs) is currently one of the two primary prevention tools against malaria in highly endemic areas of sub-Saharan Africa, along with indoor residual (house) spraying. ITNs reduce child mortality by nearly a fifth and the number of clinical episodes by one half, with no evidence of mortality delay effects "(Lengeler 2004). According to Lengeler et al., (2007) "Protection with a fully effective ITN of all children in SSA would allow preventing – 500,000 child deaths each year, a major reduction in sufferings

and economic losses, and a crucial contribution toward the achievement of the Millennium Development Goals".

With plenty of studies showing the positive results and benefits of using ITNs, lots of questions are still to be addressed. For example, how a successful distribution strategy could be accomplished and also sustained. Is it a matter of free distribution of ITNs to everyone? Should it be prioritized or should it focus on the most vulnerable groups (namely children under five years or pregnant women or the general population)? Is there a need for a more holistic programme involving community health and creation of awareness? Is there need for a strategy specific to each local community?

These and more make up some of the questions advanced by research teams and early implementers. These questions serve as an eye opener to pointing out the importance of distinguishing between efficacy and effectiveness of public health interventions. Scientific studies have portrayed the efficacy of ITNs under very controlled conditions; but also presented ambiguity that the similar interventions would also be effective under real-life delivery conditions (Lengeler et al., 1996).

Early experiences show that a wide range of implementation approaches have used to increase ITNs coverage: some have been successful. At some point in time there has been a potential demand of ITNs but no supply; at some moments people wanted nets but could not afford them at marked prices, and in another scenario people wanted to buy nets but local dealers would not stock them. In China and Vietnam, for example, the public health strategy organized the dissemination of nets: private homes had to purchase the nets and the malaria control programme ensured a free of charge delivery of insecticide. Another approach targeted vulnerable groups, pregnant mothers and newborns via public health system delivery (for example free distribution of ITNs in Eritrea, highly subsidized in Kenya and Malawi). Lately many countries, for example Tanzania, carry along free distribution of nets with other programs like measles or polio vaccination (Heierli and Lengeler, 2008), including Cameroon. Despite the implementation of various strategies to reduce the burden of malaria, it is still a public health problem in Cameroon. The rate of ITNs / LLINs (long lasting Insecticidal Nets) use is low among pregnant women and children under five (13%, MICS 2006). In addition, percentage of uncomplicated malaria cases treated correctly with first line drug among under-five children remains low (58%, MICS 2006). In the light of all these, Malaria is still the leading cause of morbidity (41%) and mortality (43%) in the health facilities in 2008. (NMCP report 2008).

A report by Ntaryike, of the Africa News newspaper, June edition, 2011, explains that many reasons could account for the malaria burden. Some specific to Cameroon include: increased anti-malarial drug resistance(for example chloroquine, mefloquine, pyrimethamine, fansidar) in various parts of the country; ignorance; shabby neighbourhood surroundings; limited use of mosquito nets or apathy around usage of treated bed-nets; climate change; difficult access to health care especially those in rural areas.

3.9. Gaps in the health system of Cameroon accounting for poor intervention in fight against malaria

The report in the document, Country Coordinating Mechanism (CCM) Cameroon (2009), ‘Scaling up Malaria for Impact in Cameroon 2010-2014’, notes the country had as an initial goal to half malaria mortality and morbidity in 2010 as compared to 2000. The recent target aims at reducing the burden of malaria by half in 2014. An analysis of this latter goal could mean that the country has not been able to meet up with the challenges of reducing malaria burden irrespective of the different programmes that have existed since 2000, for example HIPC Initiative, Global Fund, Roll Back Malaria. According to CCM, Cameroon (2009) some of the weaknesses hindering the complete execution of the national malaria control strategy include the following;

3.9.1. Insufficient numbers of adequately trained health staff

For over 20 years there has been an insufficient recruitment of the number of health staff in response to the IMF/World Bank structural adjustment. The replacement of staff due to old age, retirement and death has been very insignificant to top up the number of health staff to patients. In the rural areas, the health facilities are highly understaffed, .there is also lack of training opportunities in those rural areas causing a lack of up-to date technical expertise or not machining health works up-to date for practice (CCM Cameroon, 2009).

3.9.2. A weak National Health Management Information System

One very key important weakness of the routine health management information is the lack of completeness and inconsistency, promptness in reporting. There is no systematic filling in and / or data collection. Most often the data is submitted late. The information obtained, most often is not used for planning and management. The absence of feedback does not encourage

data collection. Lately, there has been a vertical approach in support for health programming in Cameroon rather than health sector-wide; and therefore health staff at the peripheral level often report on those programmes supplying funding. The national health management information system tools of the country have been weakened because, most of the time programme and/or specific data are not collected. A midterm evaluation survey report of the health sector strategic plan (2006) noted a scarcity of data at the operational level (CCM Cameroon, 2009). The community –level data is excluded in the national health management information system, comprising of only of data collection at the health facilities level. An estimated 16-20% of the population only, effectively use the health facilities, and therefore the majority of the health care taking place in the community goes unrecorded. Lack of finance could also account for problem of poor reporting or an up-grading to the information infrastructure (CCM Cameroon, 2009).

Data from health facilities could be potentially useful for monitoring time trends in the number of malaria cases and deaths, but it could become problematic when basic findings are not documented or poorly documented. Tables 5 and 6, for example, could be used as glaring samples to demonstrate the problem of insufficient documentation in health care. With such data collected, it could be difficult for stakeholders, policy makers or the government to have an appraisal of the malaria health situation of the target population or evaluation attainment of set goals. The years presented in the data cut across the period Cameroon benefitted from the HIPC funding supplying ITNs to under-5 children and pregnant women. Table 5 shows country data for Cameroon on the percentage of children less than five years of age with pyrexia being treated with anti-malarial drugs.

Table 5: Children under- 5 with fever being treated with anti-malarial drugs, percentage

Year	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
Percentage	-	-	-	-	66.1	-	-	-	66.3	-	57.8	-	-	-	-
(%)															

Source: UN Statistics on Millennium Development Goals Indicator, 2011

NB. Source of data 2000= MICS 2000

Source of data 2000= DHS 2004

Source of data 2000= MICS 2006

Table 6 shows the Country data, Cameroon showing children under five sleeping under insecticide-treated bed nets

Table 6: Children under- 5 sleeping under insecticide –treated bed-nets, percentage

Year	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
Percentage (%)	-	-	-	-	1.3	-	-	-	0.9	-	13.1	-	-	-	-

Source: UN Statistics on Millennium Development Goals Indicator, 2011

NB. Source of data 2000=MICS 2000

Source of data 2000= DHS 2004

Source of data 2000= MICS 2006

3.9.3. Insufficient equipment and necessary logistics

Limited logistics and storage facilities have also have been impending factors, especially at the district level: the lack of vehicles in 110 out of 174 health districts has affected supervision .Most often; the health districts are vast and have poor road networks. These, together with absence of vehicles, have affected supervisory visits. Storage commodities have been problematic. About 150 out of the 174 health districts present with lack of sufficient storage facilities. In addition, the remote, very poor zones of the country lack health facilities (CCM, Cameroon, 2009).

3.9.4. Insufficient community involvement and participation

In general, communities have been considered as more beneficiaries with insufficient involvement and participation. This lack of community participation has resulted in low utilization of services even when provided free of charge (CCM, Cameroon, 2009).

CHAPTER FOUR

4.0. CONCLUSION

Encouraging the use of insecticide treated bed nets (ITNs) to protect vulnerable population (under-5 and pregnant women) from malaria transmission has been the main preventive strategy promoted and supported by HIPC Initiative in Cameroon (Report on Cameroon Progress, PRSP, 2004).

There is evidence in the findings that a considerable number of ITNs were distributed to the target population. The Initiative, through the government used varied methods to encourage utilization and coverage of ITNs to include sensitization programmes mass media (press, radio, television programmes). The free distribution was done at clinics sites during Antenatal visits. Other groups like NGOs were part of the project to ensure a wide coverage of ITNs across the nation. The possession of ITNs does not guarantee utilization as findings revealed some determining factors: economy, culture, demography (education, housing) and environmental conditions (change in season). Furthermore, the available literature does not give information on how these challenges were addressed over time by the management of the HIPC Initiative.

Regardless of the findings identified in this study, data suggest little or an insignificant impact brought about by HIPC Initiative in the fight against under-5 related malaria mortality due to insufficient, lack of well-designed and documentation studies in this area in the published literature. To better appreciate the role of HIPC Initiative in reducing under-5 malaria mortality; there is need for proper documentation and follow up. In addition, a shift in focus understanding factors influencing use of ITNs could go a long to help design better programmes that would encourage a sustained use of ITNs in order to optimize their role as malaria control tool.

Policy implications of this study include: understanding factors influencing the use of ITNs and demystifying negative perceptions; tracking the progress and drawing inferences on both ownership and actual use of ITNs could encourage a sustained use ITNs in order to optimize their role as malaria control tool. Region-specific rapid assessments of household possession and use of ITNs should be done regularly, under-5 morbidity and mortality data tracked and properly documented. The findings obtained during such an assessment should be incorporated into programme policy.

REFERENCES

Aikins MK, Piker H, Alonso PI et al. *A malaria control trial using insecticide-treated bed nets and targeted chemoprophylaxis in a rural area of the Gambia*, West Africa 4. Perceptions of the cause of malaria and its treatment in the study area. *Transactions of the Royal Society of the Tropical Medicine and Hygiene* 87(1993) (suppl.2) 25-30

Alaii JA, Hawley WA, Kockzak MS et al. *Factors affecting the use of permethrin-treated bed nets during a randomized controlled trial in western Kenya*. *The American Journal of Tropical Medicine and Hygiene* 68 (2003), 137-141

Alaii, J.A., van den Borne, H.W., Kachur, S.P., Shelley, K., Mwenesi, H., Vulule, J., Hawley, W.A., Alonso P.L., Lindsay S.W., Armstrong J.R.M., Conteh M., Hill A.G., David P.H., Fegan G., de Antonio-Nkonjio C, Keraf CH, Simard F, Awono-Ambene P, Chouaibou M, Tchuinkam T, Fontenille D: *Complexity of malaria vectorial system in Cameroon: contribution of secondary vectors to malaria transmission*. *J Med Entomol* 2006, 43:1215-1221.

Atieli H, Zhou G, Afrane Y, Lee M-C, Mwanzo I, Githeko A, Yan G: *Insecticide-treated net (ITN) ownership, usage, and malaria transmission in the highlands of western Kenya*. *Parasites & Vectors* 2011, 4(1):113

Bandura, A. *Social foundations of thought and action: A social cognitive theory* (1986).

Barker T. *Role of Health Beliefs in Patient Compliance with Preventive Dental Advice*. *Community Dent Oral Epidemiol*, 22(5) (1994): 327-30.

Becker MH. . *The Health Belief Model and personal health behaviour*. *Health Education Monographs* 2(1974): 324–473.

Belay M, Deressa W. *Use of insecticide treated nets by pregnant women and associated factors in a pre-dominantly rural population in northern Ethiopia*. *Trop Med Int Health*. 2008 Oct;13(10):1303-13.

Bennett P, Smith C. . *Parents attitudinal and social influences on childhood vaccination. Health Education Research* 7(1992): 341–8.

Best, J. W. And Kahn, J. V. (1998). *Research in Education*. 8th Ed. USA: Allyn and Bacon.
Bhutta, Z A., Chopra, M., Axelson, H., Boerma, T., Bryce, J et al (2010). Countdown to 2015 decade Report (2000-2010): Taking stock of Maternal, Newborn and Child Survival. *The Lancet* 375, 2032-44

Binka FN and Adongo P. *Acceptability and use of insecticide impregnated bed-nets in northern Ghana. Tropical Medicine & International Health* 2(1997). , 499–507.

Bradley CB, Kegeles SM. . *The use of diabetics-specific perceived control and health beliefs measures to predict treatment choice and efficacy in feasibility study of continuous subcutaneous insulin infusion pumps. Psychology and Health* 1(1987): 133–46.

Breman, J. G., M. S. Alilio, and A. Mills. “*Conquering the Intolerable Burden of Malaria: What’s New, What’s Needed: A Summary.*” *American Journal of Tropical Medicine and Hygiene* 71 (Suppl 2) 2004:1–15.

Bureau for Increasing Use of Quinine <http://www.wellcomecollection.org/explore/sickness--health/topics/malaria/articles/malaria-treatment-and-control.aspx> accessed July 9, 2012

C. Lengeler et al: *Quick Wins Versus Sustainability: Options for the Upscaling of Insecticide-Treated Nets*, *American Journal of Tropical Medicine and Hygiene*", 77 (Suppl 6), 2007, pp 222–226

C. Lengeler: *Insecticide-treated bed nets and curtains for preventing Malaria*, *Cochrane Database Systematic Review*, 2004

Carnevale P, Mouchet J.,2001; *Malaria Vector Control in Cameroon: past, present and future.Reflection* (<http://www.ncbi.nlm.nih.gov/pubmed/16579079> accessed September 14 2012)

Carol Lancaster . *Aid effectiveness in Africa; the Unfinished Agenda*. Journal of African Economies , vol 8, Number 4(1999),pp 487-503

Carter, R., and K. N. Mendis.. “*Evolutionary and Historical Aspects of the Burden of Malaria*.” Clinical Microbiology Reviews 15 (4) 2002:564–94.

Chamel S (1986). *Health Belief Model in the research of AIDS related prevention behavior*. Publ Health Rev, 18(1): 75-80.

Chuma, J. M., M. Thiede, and C. S. Molyneux. “Rethinking the Economic Costs of Malaria at the Household Level: Evidence from Applying a New Analytical Framework in Rural Kenya.” Malaria Journal 5: 76(2006). doi: 10.1186/1475-2875-5- 76

CIA World Fact Book, 2012 <https://www.cia.gov/library/publications/the-world-factbook/geos/cm.html> (accessed 06 August 2012)

Cleland, J C., and van Ginneken, J K.(1988). Maternal education and child survival in developing countries: The search for pathways of influence *Social Science & Medicine* 27(12), 1357-1368

Cnossen, Christine ,1997. Secondary Reserach: Learning Paper 7, School of Public Administration and Law, the Robert Gordon University, January 1997. Available online (telnet): jura2.eee.rgu.ac.uk/dsk5/research/material/resmeth

Conner, M. & Norman, P. (1996). *Predicting Health Behavior. Search and Practice with Social Cognition Models*. Open University Press: Ballmore: Buckingham.

Cyrille Ndo,Benjamin Menze-Djantio,and Christophe Antonio-Nkondjio.*Awareness, attitudes and prevention of malaria in the cities of Douala and Yaoundé (Cameroon)* (2011) <http://www.ncbi.nlm.nih.gov/pmc/articles/PMC3192766/?tool=pubmed>

Debt relief and public health spending in heavily indebted poor countries* Sanjeev Gupta,1 Benedict Clements,1 Maria Teresa Guin-Siu,1 & Luc Leruth1 Available from: URL:

http://www.jubileepius.org/media/jubilee2000_archive/harvard010500.htm (date, December 2001).

Defo, K B. *Determinants of infant and early childhood mortality in Cameroon: the role of socioeconomic factors, housing characteristics and immunisation status. Soc Biol: 41 (3-4) (1994):181-211.*

Defo, K B. (1999). A- real and economic differentials in infant and child mortality in Cameroon. *Social Science and Medicine, 42 (3), 339-420.*

Edmondson Jane. (2001) page 24. *Malaria and Poverty: Opportunities to Address Malaria through Debt Relief and Poverty Reduction Strategies; Working document prepared by Malaria Consortium. Pg. 24.*

Eisele T, Keating J, Littrel M, Larsen D, McIntyre K: Assessment of Insecticide-Treated Bednet use among children and pregnant women across 15 countries using standardized national surveys. *Am J Trop Med Hyg 2009, 8:209-214.*
Englewood Cliffs, NJ: Prentice- Hall, Inc.

Etang J, Fondjo E, Bintsindou P, Bagayoko M, Manga L: Profil entomologique du Cameroun. *Rapport Minsanté Cameroun et OMS 2007, 1-42*

Feilden, R.M. (1996) Experiences of implementation. In: Lengeler, C., Cattani, J., & de Savigny, D. (eds.): *Net gain: a new method for preventing malaria deaths.* Geneva, World Health Organization/Ottawa, International Development Research Centre, pp 55-110

Francisco A, Hall A.J., Shenton FC, Cham K, & BM, G. *The effect of insecticidetreated bednets on mortality of Gambian children. Lancet, 337(1991), 1449-1502*

Gareth R., Jones and Jennifer M. George;. *Contemporary Management(2008)*

Gilles, M.T., de Meillon, B. *The Anophelinae of Africa south of the Sahara. 54(1968)., 1-343*

Glanz, K., Rimer, B.K. and Lewis, F.M. *Health Behavior and Health Education. Theory, Research and Practice.* San Fransisco: Wiley & Sons. (2002).

Green and Kreuter Health Promotion and Planning : *An Educational and Ecological Approach* (third edition) Mountain View, California. Mayfield Publishing Company. (1999)

Habluetzel,A., Diallo, D.A., Esposito, F., Lamizana, L., Pagnoni, F., Lengeler, C.,Traoré, C., & Cousens, S.N.. *Do insecticide-treated curtains reduce all-cause mortality in Burkina Faso?*Trop Med Int Hlth, 2(1997), 855-862

Heggenhougen K, Hackethal V and Vivek P.*The Behavioural and social Aspects of Malaria and its control.* UNDP/World Bank/WHO/Geneva(2003)

Hobcraft, J.N., R.W. McDonald and S.O. Rustein, 1985. Demographic determinants of infant and early child mortality: A comparative analysis. *Popul. Stud.*, 39: 363-386.

Hochbaum, G. M. *Public participation in medical screening programs: A socio-psychological study.* Public Health Service publication. Washigton, D.C(1958).

<http://go.worldbank.org/I7KMKA50S0> accessed July 10,2012)

<http://www.rbm.who.int> (May 2000).

http://www.who.int/features/factfiles/malaria/malaria_facts/en/index2.html accessed July 9, 2012

IMF, The Logic of Debt Relief for Poorest Countries, 2000

Institute for Health Metrics and Evaluation. Financing Global Health 2010: Development assistance and country spending in economic uncertainty. Seattle, WA: IHME, 2010.

International Monetary Factsheet, Poverty Reduction Strategy Paper 2012
<http://www.imf.org/external/np/exr/facts/prsp.htm> accessed July 2012)

International Monetary Fund (2003)_Cameroon Poverty Reduction Strategy Paper, Available at www.imf.org/. (Accessed 27 July 2012)

Janz N, Becker MH. 1984. The Health Belief Model: a decade later. *Health Education Quarterly* 11: 1–47.

Joint Committee For The Coordination And Monitoring Of The National Aids, Tuberculosis And Malaria Control Committees, Cameroon, 2007

Kegeles S. *Health Belief Model and personal health behavior*. Soc Scio Med, 14(47) (1980): 32-35

Korenromp EL, Miller J, Cibulskis E, Cham MK, Alnwick D and Dye C. *Monitoring mosquito net coverage for malaria control in Africa : possession vs use by children under 5 years*. Tropical Medicine and Internal Health 8(2003),693-703

Langie JK. *Social networks, health beliefs and preventive health behaviour*. Journal of Health and Social Behaviour 18(1977): 244–60.

Lankinen, K.S., Bergström, S., Måkelå, P.H., and Peltomaa M. *Health and disease in developing countries*. London: Macmillan(1994).

Lengeler, C. (2003) Insecticide-treated bednets and curtains for preventing malaria (Cochrane Lengeler, C., de Savigny, D., & Cattani, J. (Eds.). (1996). Net Gain: A New Method of Preventing Malaria Deaths. Geneva & Ottawa: WHO/IDRC.

M. Katherine McCaston (1998) -Partnership & Household Livelihood Security Unit

MacCormack CP and Snow RW(1986) Gambia Cultural preferences in the use of insecticide-impregnated bed nets. The Journal of Tropical medicine and Hygiene 89, 295-302

Macintyre K, Keating J, Okbaldt YB, Zerom M, Sosler S, Ghebremeskel T, Eisele TP. *Rolling out insecticide treated nets in Eritrea: examining the determinants of possession and use in malarious zones during the rainy season*. Trop Med Int Health. 2006 Jun;11(6):824-33.

Malaney, P., A. Spielman, and J. Sachs. 2004. "The Malaria Gap." American Journal of Tropical Medicine and Hygiene 71 (Suppl 2): 141–46.

Mbacke, C., and Mbodj, F. G. (1990). Death during infancy in Africa: demographic aspects [*Vie Sante*](#). (3):8-11.

Minsanté: Rapport sur l'évolution des cas d'accès palustres dans les districts de santé de la ville de Yaoundé. Rapport du Programme National de lutte contre le paludisme du Cameroun 2010, 35

Mulholland, E K., Smith, L., Canero I., Becher, H., Lehmann, D .(2008). Equity and child survival strategies. *Bulletin of the World Health Organization*, 86(5),399-407.

Mvondo JL: Malaria in Cameroon.

Myers, M. D. 'Qualitative Research in Business and Management'. Sage Publishers, London. (2009)

Nahlen, B.L., and Phillips-Howard, P.A. *Community reactions to the introduction*

Neuman, L. W. (1997) 'Social Research Methods: Qualitative and Quantitative Approaches', Needham Heights, MA: Allyn and Bacon (2003 [b]).

Nevill, C.G., Some, E.S., Mung'ala,V.O., Mutemi,W., New, L., Marsh, K., Lengeler, C., and Snow,R.W. *Insecticide treated bednets reduce mortality and severe morbidity from malaria among children on the Kenyan coast*. *Tropical Medicine and International Health*, 1(1996), 139–46.

NIAID. (2000). Malaria. NIH Publication (00-4715, April 2000).

Njan-Nloga A, Robet V, Toto JC, Carnevale P: Le cycle gonotrophique d'*Anopheles moucheti*, vecteur principal du paludisme au Sud Cameroun. *Bull Liaison Doc OCEAC* 1993, 26:28-71

Novak, Thomas P. 1996.Secondary Data Analysis Lecture Notes. Marketing Research, VanderbiltUniversity.(telnet):www2000.ogsm.vanderbilt.edu/marketing.research.spring.1996.

Organisation Mondiale de la Sante, Afrique (2009):Strategie de Cooperation de l’OMS avec les pays 2010-2015 Cameroun. Available at www.afro.who.int/index.php(Accessed 27 July, 2012)

Ravishankar N, Gubbins P, Cooley RJ, et al. *Financing of global health: tracking development assistance for health from 1990 to 2007*. Lancet 2009; 373: 2113–24.Review)
The Cochrane Library (Issue 1, 2003, Oxford: Update Software)

Roll Back Malaria (RMB). (2000). Potential for Progress. Roll Back Malaria:

Ronis DL, Antonakos CL, Lang WP (1996). *Usefulness of multiple equations for predicting preventive oral health behaviors*. Health Educ Q, 23(4): 512-27

Rosenstock, I. 1966. *Why people use health services*. Milbank Memorial Fund Quarterly. 44; 94-124

Sachs, J., and P. Malaney. 2002. “*The Economic and Social Burden of Malaria*.” Nature415 (6872): 680–5.

Samba E, (2001). The malaria burden and Africa. Am J Trop Med Hyg, 64 (1–2 Suppl): ii. Preface

Sarah Boslaugh 2007. *Secondary Data Sources for Public Health: A Practical Guide*. Cambridge University Press

Smith, D. L, F. E. McKenzie, R. W. Snow, and S. I. Hay. 2007. “Revisiting the Basic Reproductive Number for Malaria and Its Implications for Malaria Control.” PLoS Biology 5 (3): e42. doi: 10.1371/journal.pbio.0050042.

Snow, R. W., C. A. Guerra, A. M. Noor, H. Y. Myint, and S. I. Hay. 2005. “The Global Distribution of Clinical Episodes of Plasmodium Falciparum Malaria.” Nature 434: 214–17.

Snow, R.W., McCabe, E., Mbogo, C.N.M., Molyneux, C.S., Some, E.S., Mung'ala, V.O., & Nevill, C.G. (1999). The effect of delivery mechanisms on the uptake of bed net re-impregnation in Kilifi District, Kenya Health Policy Plan, 14(1), 18-25

Stein J (1992). Mammography usage and Health Belief Model. Health Educ Q, 19(4): 448-51.

The World Health Report 2002: reducing risks, promoting healthy life. Geneva, World Health Organization, 2002

Thomason M, Conner S, Bennett S et al. (1996) Geographical perspective of bed net use and malaria transmission in the Gambia, West Africa. Social Science and Medicine 43, 101-112

Toe L, Skovmand O, Dabiré K, Diabate A, Diallo Y, Guiguemde R, Doannio C, Akogbeto M, Baldet T, Gruénais E: Decreased motivation in the use of insecticide-treated nets in a malaria endemic area in Burkina Faso. Malar J 2009, 8:175.

Training Reports for TWF investigators (August-September) 1998.

UNICEF (2010). Cameroon Statistics. Available at: www.unicef.org (Accessed 25 July 2012) University Press.

Victora et al (2008): Countdown to 2015 for maternal, newborn and child survival: the 2008 report on tracking coverage and intervention. *The Lancet* 371, 1247-58 *western Kenya. American Journal of Tropical Medicine and Hygiene*, 68, Suppl. 4.

WHO (1993 [a]). Implementation of the global malaria control strategy Report of a VMO studygroup on the implementation of the global plan of action for malaria control 1993-2000

(WHO Technical Report No. Series No. 839). World Health Organization WHO (1996).

Tropical diseases control: Malaria in the world. Geneva: Division of control of tropical diseases (CTD/TDT/96.12), WHO

WHO (1999). The World Health Report 1999: making a difference. Geneva, World Health Organization.

WHO Fact sheet No.180 (Geneva).

WHO(2002 RMB Technical Support Network for ITNs; Scaling up Insecticide Treated Nesting Programmes for Africa: strategic network for coordinating National Action. WHO /RBM Geneva

WHO. World Malaria Report 2010. Geneva: World Health Organization, 2010. http://www.who.int/malaria/world_malaria_report_2010/worldmalariareport2010.pdf (accessed Aug 2, 2011)

WHO. Geneva: World Health Organisation; 2005. *World Malaria Report 2005*.

WHO/CAMINFOS: Lutte contre le paludisme. *Le Cameroun déroule son plan stratégique 2002–2006* 2002.

WHO/UNICEF. The Africa Malaria Report 2003. In: WHO/CDS/MAL/2003.1093, ed. Geneva: WHO, 2003.

World Bank (1993).World development report 1993 - Investing in Health. Oxford: Oxford World Health Organization (1998). Malaria [Online]. Fact Sheet No 94, Available from: <http://www.who.int/inf-fs/en/fact094.html> [29-03-01]

www.malariaworld.org accessed July 12, 2012

Yin, R.K(2002) Case Study Research: Design and Methods, Sage Publications London

Zimicki, S. (1996). Net Gain: Promotion in Sub-Saharan Africa. In Lengeler, C., de Savigny, D., & Cattani, J. (Eds.). Net Gain:A New Method of Preventing Malaria Deaths. Geneva & Ottawa: WHO/IDRC

(<http://www.healthscout.com/ency/1/347/main.html> accessed July 6, 2012)

([http:// www.mara.org.za](http://www.mara.org.za) accessed July 10,2012)

(<http://stats.oecd.org/glossary/detail.asp?ID=5955> accessed July 3, 2012)

(<http://www.againstmalaria.com/downloads/RBMBurdenMalariaAfrica.pdf>.accessed July3 2012)

(<http://www.imf.org/external/np/exr/facts/hipc.htm> accessed July 15 2012)

(<http://www.imf.org/external/np/exr/ib/2000/092300.htm> accessed July 4 2012)

(<http://www.ohprs.ca/hp101/mod4/module4c15.htm> accessed July 10, 2012)

(<http://www.ohprs.ca/hp101/mod4/module4c15.htm> accessed July 15 2012)

(<http://www.ohprs.ca/hp101/mod4/module4c15.htm> accessed July 15,2012)

(<http://www.who.int/healthinfo/statistics/indunder5mortality/en/> accessed July 3, 2012)

(<http://www.who.int/malaria/publications/atoz/itnspospaperfinal.pdf> accessed July 3, 2012)

(http://www.map.ox.ac.uk/browse-resources/transmission-limits/Pf_limits/CMR/ accessed September 2012)

(www.africanews.com/site/cameroon)

http://www.africanews.com/site/Cameroon_Using_mosquito_nets_to_catch_votes/list_messages/39574