

**THE USE OF BED NETS BY MOTHERS / CARERS OF CHILDREN
UNDER FIVE YEARS OLD IN THE PAEDIATRICS OUT-PATIENTS
DEPARTMENT (P.O.P.D) OF
THE 37 MILITARY HOSPITAL IN THE PREVENTION OF
MALARIA.**

KNUST
BY:

HELENA SARPEI-NUNOO (MRS)

**A thesis submitted to the Department of Social and Clinical Pharmacy,
Kwame Nkrumah University of Science and Technology in partial
fulfillment of the requirement for the degree of**

MASTER OF SCIENCE

**Faculty of Pharmacy and Pharmaceutical Sciences
College of Health Sciences**

October 2011

TO EVERYTHING THERE IS A SEASON, AND A TIME TO EVERY PURPOSE
UNDER HEAVEN. **ECCLESIASTES 3: 1**

KNUST



DECLARATION

I hereby declare that this submission is my own work towards the MSc and that, to the best of my knowledge, it contains no material previously published by another person nor material which has been accepted for the award of any other degree of the University, except where due acknowledgement has been made in the text.

KNUST

.....
Student Name & ID

.....
Signature

.....
Date

Certified by:

.....
Supervisor(s) Name

.....
Signature

.....
Date

Certified by:

.....
Head of Dept. Name

.....
Signature

.....
Date



DEDICATION

I dedicate this thesis to my wonderful husband and three lovely children, Henry, Tracy and Nicholas.

KNUST

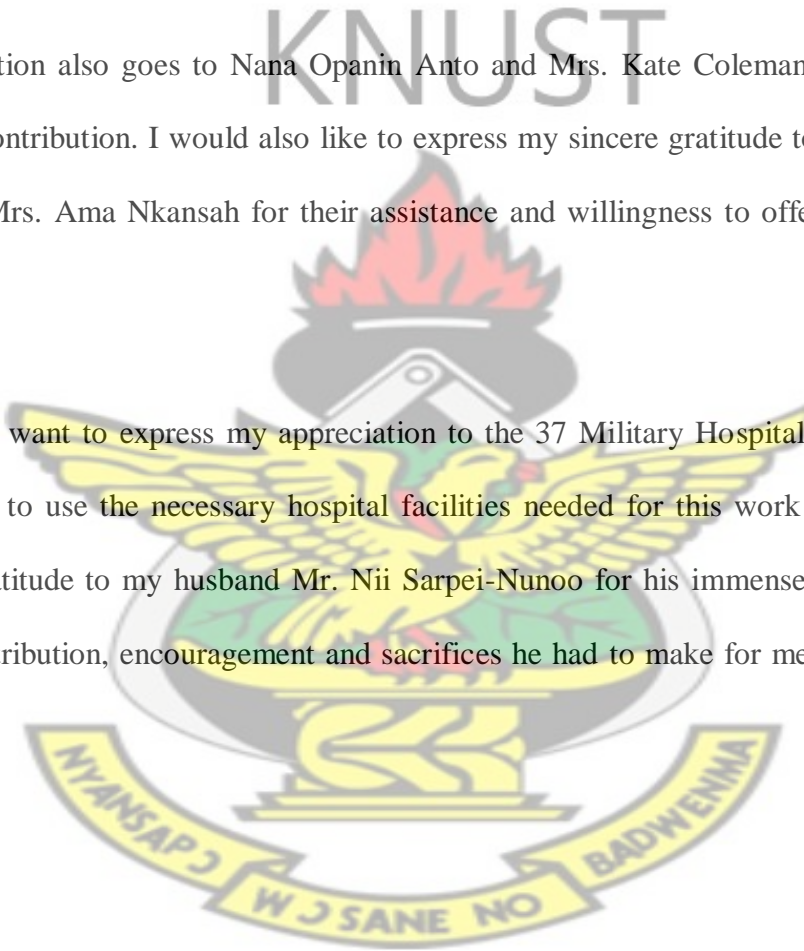


ACKNOWLEDGEMENT

My profound thanks go foremost to God Almighty for seeing me successfully through the MSc Clinical Pharmacy course and this thesis. I would also like to thank my academic supervisors Prof. Mahama, Dr. Mrs. Frances Owusu Daako and Mrs. Afia Frimpomaa Asare Marfo for their supervision and input.

My appreciation also goes to Nana Opanin Anto and Mrs. Kate Coleman-Sarfo for their invaluable contribution. I would also like to express my sincere gratitude to Mr. Raymond Tetteh and Mrs. Ama Nkansah for their assistance and willingness to offer every needed help.

I would also want to express my appreciation to the 37 Military Hospital Directorate for allowing me to use the necessary hospital facilities needed for this work and finally my profound gratitude to my husband Mr. Nii Sarpei-Nunoo for his immense and invaluable support, contribution, encouragement and sacrifices he had to make for me throughout the MSc course.



ABSTRACT

Before the development of insecticide-treated nets (ITNs) as a new technology in the mid-1980s, people in many countries were already using nets, mainly to protect themselves against biting insects and for cultural reasons. It was only recently appreciated that a net treated with insecticide offers much greater protection against malaria. : not only does the net act as a barrier to prevent mosquitoes biting, but also the insecticide repels, inhibits, or kills any mosquitoes attracted to feed. The main objective of this study is to assess adherence to the use of bednets in malaria prevention. The study was descriptive cross sectional in design.

This was done by designing a questionnaire to capture the specific objectives of this research and included both male and female from 14 years above who were mother/carers of children under 5 years who had had malaria within the last six months at the 37 Military Hospital, Paediatrics Out-patients Department (POPD). A sample size of 200 people was interviewed using stratified sampling.

The results show that malaria is of concern to majority of mothers/carers and that the principal reason for not adhering to use of ITN's in spite of its effectiveness is because of lack of information and its high cost.

Over 80% of participants perceived the causes of malaria to be mosquitoes. Only 95% indicated that they had heard of ITN's. 80% think it is very good and effective as a

preventive measure. However, only 55% claim to have actually used ITN's. High cost and inadequate education being some of the main causes of lack of adherence.

TABLE OF CONTENTS

	Page
DECLARATION	ii
DEDICATION	iii
ACKNOWLEDGEMENT	iv
ABSTRACT	v
ACRONYMS	viii
 CHAPTER 1	 1
1.1 INTRODUCTION	1
1.2 Literature Review	1
1.3 Statement of the Problem.....	16
1.4 Rational for the Study.....	17
1.5 Aim.....	18
1.6 General Objectives.....	18
 CHAPTER 2	 19
METHODOLOGY	19
2.1 Study Area	19

2.2	Development and Validation of Survey Instruments.....	21
2.3	Data Collection	22
2.4	Ethical Clearance.....	23
2.5	Data Processing and Analysis.....	23

CHAPTER 3	24
------------------------	----

RESULTS	24
----------------------	----

3.1	Socio-demographic data.....	24
3.2	Knowledge and perception on malaria control.....	26
3.3	Methods of malaria prevention by respondents.....	30
3.4	Mothers and carer's awareness of bednets (ITN's and N-TN's).....	30
3.5	Pricing and affordability.....	34

CHAPTER 4	35
------------------------	----

DISCUSSION AND CONCLUSIONS	35
---	----

4.1	Socio-demographic characteristics.....	35
4.2	Knowledge and perception on malaria.....	35
4.3	Use of bednets for malaria prevention.....	37
4.4	Adherence to ITN's.....	37
4.5	Pricing and affordability.....	39
4.6	Comparison with other works.....	40
4.7	Relevance of results to pharmacy practice.....	42

4.8	Limitations of research work.....	43
4.9	Conclusions.....	44
4.10	Recommendations.....	45
REFERENCES.....		48
APPENDICES.....		52
QUESTIONNAIRE.....		52

ACRONYMS

ANC	Antenatal Clinic
CDC	Centre for Disease Control
CHD	Child Health Day
CHW	Child Health Week
CIDA	Canadian International Developmental Agency
DHS	Demographic and Health Survey
EPI	Expanded Programme on Immunization
GIVS	Global Immunization Vision and Strategy
IDRC	International Development Research Centre
ITN	Insecticide Treated Nets
LLIN	Long Lasting Insecticidal Nets
MICS	Multiple Indicator Cluster Survey
NGO	Non Governmental Organization
N-TN	Non-treated Nets
NID	National Immunization Day
OPV	Oral Polio Vaccine
RBM	Roll Back Malaria
TDR	Special Programme for Research and Training in Tropical Diseases
UNF	United Nations Foundation

UNICEF	United Nations International Children's Fund
WHO	World Health Organization
WHOPES	World Health Organization Pesticide Evaluation Scheme

CHAPTER ONE

1.1 INTRODUCTION

Malaria is the world's leading killer among infectious diseases in tropical Africa, Southeast Asia, parts of India, Southern China, Latin America, Haiti and some Pacific Islands. (1), (2).

It is a parasitic infection acquired when a mosquito injects the parasite into the body. After a few weeks to several months, those who are infected develop flu-like symptoms, such as high fever, headaches, muscle aches, nausea and abdominal discomfort. If left untreated, the malaria can progress to anaemia, heart or kidney failure, coma or even death. (2).

Malaria kills more than 1.5 million people each year, - approximately one death every 20 seconds (3). It is firmly rooted in 103 countries.

Using mosquito netting reduces the risk of malaria infection and other mosquito borne diseases by a factor of 10 to 20. (2)

1.2 LITERATURE REVIEW

Malaria threatens the lives of 3.2 billion people globally and leads to over one million deaths annually (3). Malaria is hyper-endemic in Ghana, accounting for 44% of out patients attendance, 13% of all hospital deaths, and 22% of mortality among children less than five years of age (3), (4). Though malaria is responsible for 9% of overall mortality in Ghana, at least 40% of malaria deaths occur among infants and children under the age of five. (5)

Insecticide Treated Nets (ITNs) are becoming increasingly available to vulnerable populations at risk of malaria. Their appropriate and constant use is essential for preventing malaria, (2), but Insecticide Treated Net (ITN) use often lags behind ITN ownership. In order to increase ITN use, it is necessary to devise strategies that accurately identify, differentiate and target the reasons for non-use.

When it comes to defeating malaria, we may not need to employ complicated techniques but a simple technique like ITN can help prevent malaria. In several studies in Africa, plain old mosquito netting (treated with insecticide) has protected large numbers of people. (6).

Roll Back Malaria (RBM) is a global partnership founded in May 1998 by WHO, UNICEF, UNDP and World Bank, with the goal of helping countries to reduce the global burden of malaria. It focuses on the communities and emphasizes the use of ITNs, which are effective in reducing human contact with mosquitoes (3). Results of recent research suggests that ITNs can reduce malaria episodes by 48 to 50% (7), and if universally used could prevent an estimated seven percent of global under

five mortality (8). The use of ITNs could save the lives of more children than any other single intervention except breast-feeding and oral rehydration therapy (8). At an estimated cost of US \$ 1.20 per person protected per year, ITNs are considered to be one of the most effective health interventions in Ghana (9).

Despite evidence demonstrating that the use of ITNs decreases malaria related morbidity and mortality, it is difficult to encourage consistent and appropriate use of bed nets. Estimation from Africa as a whole suggests that only three percent of children less than five years of age sleep under ITNs. (3). Past research in a number of countries reveals that children may fail to sleep under bed net for a number of reasons. For example, parents attribute malaria to causes other than mosquitoes and may not attribute bed net usage with the prevention of malaria. Additionally, parents may consider it too expensive to purchase a bed net or to treat it with insecticide and despite increased availability and improved distribution systems, many communities have limited access to bed nets (3), (10). Parents may consider using bed nets difficult because sleeping under them can be hot and uncomfortable, or they may believe that bed nets resemble burial shrouds or that insecticides used to treat ITNs will harm their children (11). On the other hand community members often value bed nets because they decrease the nuisance associated with mosquitoes, but wrong beliefs of parents/carers and lack of information concerning ITN does not encourage the constant use of bed net especially during the dry season when mosquitoes are less noticeable, (12), (13).

Many other factors also influence caregivers' decisions and malaria prevention behaviours (14), (15). For example, community perceptions, beliefs and attitudes about malaria causation, prevention and cure influence efforts to address malaria and are often overlooked in control efforts (16), (17). In the case of Ghana, some individuals maintain the notion that certain types of “fever”, (local terms for fever and malaria often coincide) are caused by heat of the sun and therefore cannot be prevented by bed net use, intermittent treatment or insecticides, (18). Cost may also discourage parents from practicing optimal health behaviours. With malaria the cost of bed net and the cost of treatment (clinic fees and medications) for sick individuals play an important role in determining which behaviours parents practice. In addition, the incidence of malaria and immunity levels within a population can influence community perception of disease severity and may influence the perceived importance of engaging in behaviours such as bed net use (15), (19).

The technique of using ITNs is certainly cheap, the nylon nets are very inexpensive and the pyrethroid insecticides cost even less than the permethrin which must be applied every six months to the bed net. (20).

Economy is important, even in the control of an epidemic disease like malaria. While international agencies no longer regularly fund malaria control, several African countries are considering using treated mosquito nets to alleviate the enormous toll malaria exacts on their populations. The WHO reports that the estimated direct and indirect cost of malaria in Africa was US \$1.8 billion in 1995

(21), (22). It seems therefore that these low-tech community based interactions are the best way to go.

1.2.1 Levels of Malaria Prevention

Prevention of malaria can aim at either

- a) Preventing infection by avoiding bites by parasite-carrying mosquitoes or,
- b) Preventing disease by using anti-malaria drugs prophylactically. The drugs do not prevent initial infection through a mosquito bite, but they prevent the development of malaria parasites in the blood which are the forms that cause disease. This type of prevention is also called “suppression”. (23).
- c) Prevention and Control in Endemic Areas. Prevention is an important component of malaria control in endemic areas. It is achieved through;
 - i) Vector control
 - ii) Personal protection measures such as insecticide-treated bed nets and mosquito repellent creams
- d) Preventive treatment with anti malaria drugs of vulnerable groups such as pregnant women who receive intermittent treatment. (24).

1.2.2 Malaria – Vector Control

General information

Vector control aims to decrease contact between humans and vectors of human disease. Control of mosquitoes may prevent malaria as well as other mosquito-borne diseases.

Vector control for the prevention of malaria includes;

- Insecticide-treated bed nets,
- Indoor residual spraying,
- Source reduction (larval control). (24)

1.2.3 General Information about Mosquito Nets and ITNs

Nearly 30 years ago, the World Health Organization (WHO) predicted that malaria would never be eradicated, but today, for the first time since the 1950's, there is a real hope for controlling the disease. Scientists in Canada and Africa have been studying a new twist on an old age method of combating malaria by sleeping under nets that keep mosquitoes at bay. Recent large scale studies at Kenya, Ghana, and the Gambia have proven that the innovative use of ITNs is a highly effective method for controlling the spread of malaria. (10).

Untreated nets have long been used in the tropics, but they have to be well maintained and used properly to be effective. By contrast, nets treated with pyrethroid insecticides provide more than a physical barrier; they actually deter mosquitoes from feeding and drive them out of their hiding places. Even a treated net with large holes provides as much protection as a standard one, reducing mosquito bites up to 95%. Simple and safe to use they lend themselves to effective community-based malaria control programs. (10), (21).

1.2.4 Insecticide Treated Bed Nets (ITNs)

ITNs are a form of personal protection that has repeatedly been shown to reduce severe disease and mortality due to malaria in endemic regions. In community wide trials in several Africa settings, ITNs have been shown to reduce mortality by about 20%. (10).

Untreated bed nets form a protective barrier around persons using them; however mosquito can feed on people through the nets. The application of a residual insecticide greatly enhances the protective efficacy of bed nets. The insecticide used for treatment kills mosquitoes and other insects. The insecticides also have repellent properties that reduce the number of mosquitoes that enter the house and attempt to feed. In addition, if high community coverage is achieved, the numbers and longevity of mosquitoes will be reduced. When this happens, all members of the community are protected regardless of bed net ownership and use. To achieve such effects, high community coverage is required. (21)

There are several types of nets available. Nets may vary by size, material and/or treatment. Most nets are made of polyester but nets are also available in cotton, polyethylene or poly propylene.

Currently only pyrethroid insecticide are approved for use on ITNs. These insecticides have very low mammalian toxicity, but are highly toxic to insects and have a rapid knockdown effect even at very low doses. Pyrethroids have a high

residual effect, they do not rapidly break down unless washed or exposed to sunlight. (10).

1.2.5 The need for the use of bed nets as an important tool for the prevention of malaria.

Malaria is a serious public health problem, causing more than 1.5 million deaths each year, (3) predominantly among young children. In addition to child mortality, malaria can also cause severe anemia and cerebral complication in children.

This may have serious consequence for long term survival of children as well as hinder education and social development.

The major focus of UNICEF in the RBM strategy is at the community level, concentrating particularly on malaria prevention through the use of insecticide-treated nets, community awareness, social mobilization and improved access to quality treatment.

Insecticide treated nets (ITNs) are a powerful public health tool in the fight against malaria. Regular use by young children can reduce their overall risk of mortality by 20% and clinical malaria episodes by 50%. (21). In the poorest parts of the world, where effective window screening are lacking, insecticide-treated bed nets are

arguably the most cost-effective way to prevent malaria transmission, one bed net can safely last a family for four years, thanks to a long lasting insecticide woven into the net fabric.

Studies show that the use of insecticide treated bed nets can reduce transmission as much as 90% in areas with high coverage rates. (2). Bed nets prevent malaria transmission by creating a protective barrier against mosquitoes at night, when the vast majority of transmissions occurs between 10.00pm and 4.00am.

The African malaria mosquitoes generally bite late at night or early morning. A bed net is usually hung above the centre of a bed or sleeping space so that it completely covers the sleeping person. A net treated with insecticides offers about twice the protection of an untreated net and can reduce the number of mosquitoes that enters the house and the overall number of mosquitoes in the area. (21).

Currently, nets are treated with pyrethroid insecticides. These insecticides have very low levels of toxicity for humans, but are highly toxic to insects. By repelling the mosquitoes a bed net can protect other people in the room outside the net. When enough nets are used in an area, the insecticide used in the nets fabric makes the entire community safer even for those individuals who did not have nets. Malaria have been brought under control and even eliminated in many parts of Europe, Asia and the Americas. Yet in Africa malaria infections have actually increased over the past decades. Everyday 3,000 children die from the disease. (10).

1.2.6 The impact of (ITNs) on child mortality.

Child mortality can be reduced. Large studies of insecticide-treated nets in the Gambia, Ghana, and Kenya has indicated that the use of this simple technology can reduce the overall child mortality by 17% - 63%. (9), (10), (21).

In the Kenya study, funded largely by IDRC and WHO, the use of ITNs achieved the following:

- Reduction in deaths from life-threatening malaria by 44%,
- Lowering of the hospitalization of children with malaria by 41%,
- Reduction of childhood deaths from all causes by 33%.

In Ghana's northern savannah where malaria transmission rates are even higher, ITNs reduced childhood death by 17%. (9), (21).

Based on these studies, scientists estimate that widespread distribution and use of treated bed nets could save the lives of at least 500,000 children a year in Africa alone. (10).

Advantages of using bed nets.

Affordability: Because ITNs can be re-used they are expected to be less expensive in the long term than the combined cost of other prevention measures and treatments, including anti-malaria drugs (to which malaria parasites are becoming increasingly resistant), insecticide sprays, coils and other traditional control methods. Some people in Africa spend between 5% - 20% of their income on less effective methods to prevent and treat malaria. (5), (9).

Economic benefits: In Benin and Cote d'Ivoire, co-operatives are sewing and selling insecticide treated nets. This promotes the use of nets, creates employment for women and, and raises their status in the community. (10).

1.2.7 Factors that may influence the widespread acceptance and use of ITNs.

Many factors influence whether ITNs achieve widespread acceptance and use.

Amongst them are:

- Access to netting and insecticides re-dipping,
 - Affordability,
 - Public education,
 - An increase in the knowledge base required to support the design and implementation of national ITNs programmes (education),
 - The development of public health communication tools,
 - Strategies to support a national ITN programming,
 - Also essential will be improved national, political and policy environment.
- (25).

1.2.8 Cost and availability

Unfortunately, neither nets nor the insecticides required are widely available or affordable in most countries of Sub-Saharan Africa (SSA). Governmental and non-governmental health programs are searching for ways to increase access to nets and insecticides by several means, including reducing their market price.

According to PATH Canada, a net costs between CAD\$5 and \$10 un-dipped, (add about CAD\$0.50 for a dipped net). The cost varies by country. Polyester nets can last up to 5 years and have to be re-dipped every six months, a process that can be done locally.

1.2.9 Insecticides-treated nets

An insecticide treated net consists of an untreated net and an insecticide treatment kit. It is very important to re-treat the net regularly with insecticides. Standard specifications exist primarily to protect and benefit users. However, certain qualities are culturally-specific and attempts to standardize all features of ITNs would be inadvisable. UNICEF procures a range of these nets in the most popular sizes, shapes and colours. Standards are essential for quality control and UNICEF follows WHO specification for netting materials strictly. (3). The quality of yarn is important as it affects the net's ability to absorb sufficient insecticides during re-treatment.

1.2.10 Insecticides

Insecticide treated nets should be regularly treated with one of the insecticides currently recommended by WHO. The most popular method is to use the treatment kits. A treatment kit consists of a single dose of insecticides, sufficient for the treatment of one net, together with protective gloves, a measuring bag, and instructions in French and English. (10).

1.2.11 Long lasting insecticide nets

Long lasting insecticidal nets (LLIN's) have been developed in response to re-treatment rates of conventional insecticide treated nets, especially in Africa. A long lasting net is a ready to use pre-treated mosquito net, which requires no further treatments during its expected life span. This is the preferred choice of mosquito net for UNICEF support programs. (21).

Mosquito nets are a natural alternative to toxic chemical sprays as a method of protection against mosquitoes, moths, sand flies and other insects.

1.2.12 Types of treated mosquito's nets.

Amongst these are:

- Adventure II treated mosquito net
- Long lasting mosquito net
- Treated mosquito bed net

They all come with different net specification e.g.:

- Type of material,
- Tensile strength of the net,
- Mesh,
- Weight,
- Type of treatment. (10), (25).

All these nets are invaluable for a safe slumber in any rural location with too many mosquitoes, other bugs or even spiders. The World Health Organization and the US

Centre for Disease Control highly recommended using various netting options to reduce contact with mosquitoes.

Here is a list of what to look for in proper mosquito netting.

- A mesh size of 1.2mm x 1.2mm is large enough for air circulation, but small enough to keep mosquitoes out. For effective malaria protection, the recommended mesh size is 120-200 holes per square inch.
- Nets made of polyester or polyamides are light weight and longest lasting.
- Use of denier (strength of fiber used to make net) that is between 70 and 100. The strongest is 100; anything below 70 usually tears easily.
- For bed netting, rectangular mosquito nets offer the most comfortable and spacious protection. Bed netting should be wide enough to drape the sleeping person without touching the body.

All mosquito nets should be pre-treated with insecticides to ensure maximum protection. (10).

1.2.13 Government and NGO co-ordination of bed nets.

During the planning process for a measles campaign (which can take 6-9 months), a country can choose to integrate other health interventions such as insecticide treated bed nets. When a country decides to distribute bed nets during its measles campaign, the measles initiative and the government of the country co-ordinate the planning of the measles campaign and the distribution of bed nets such that they are

fully integrated. Together WHO, UNICEF, and the local Ministry of Health determine where to purchase the bed nets and who will be responsible for bed net storage, distribution, social mobilization and follow up surveying. (26).

1.2.14 Distribution of bed nets and education on their use.

Throughout the integrated child health campaign, children travel to vaccinating posts where they receive vaccinations and other medicines, as well as the insecticide treated bed nets. Health workers and volunteers provide the immunizations and educate children and their families on the use of bed nets, while observers from various agencies and organizations monitor the activities of the campaign and provide support to the health workers and volunteers as needed. (26). However this scenario describes just a few isolated centres where observers from various agencies and organizations monitor the activities of the campaign. This is not the same thing that happens in the majority of the vaccination centres which are normally manned by health workers.

1.2.15 Evaluation of the distribution system of ITNs

The evaluation of a bed net distribution generally takes place just prior to rainy seasons, providing an opportunity to re-educate families on the use of bed nets as they enter the time of year during which mosquitoes tend to be more prevalent. The entire process of purchasing and distributing insecticide-treated bed nets to parents/carers of children under the age of five, as well as providing education and follow up surveying on their use is accomplished at a cost of just US\$10 per bed

net. Although US\$10 for a bed net would not sound like much, the cost makes them out of reach for most people at risk of malaria in Africa, where many people survive on less than US\$1 a day. (22), (27).

1.3 STATEMENT OF THE PROBLEM

Insecticide –Treated Bed nets (ITNs): Commodity or Public Health Intervention?

Insecticide–Treated Bed nets (ITNs) are now an important method of controlling malaria. Their protective effect will be the strongest if they are used by a high proportion of the population at risk. *Should ITNs be sold as a commodity, using social marketing to stimulate their sale?* Sale of ITNs might increase their value to the users and might ensure their sustainability. ITNs should continue to be available after donor agencies have left.

Should ITNs be provided free of charge to the groups most at risk? e.g. vaccines?

ITNs are a public health intervention that decreases deaths and disease. Thus like vaccines ITNs might deserve to be given free to those who need them most.

In Africa where 90% of malaria deaths occur, many of those suffering most from malaria, - many of the rural poor cannot afford even the modest cost of US\$10 of an insecticide treated net. Rural areas where ITNs are sold through social marketing have not achieved the desired coverage (i.e. 60% of children under 5 years and 60% of pregnant women using ITNs), (22). Initial trials of free distribution of ITNs during immunization campaigns or antenatal clinics have been very successful because during these campaigns of free distribution of ITNs, coverage of children

under 5 years of age was increased from less than 10% to over 80% in one week. (27).

1.4 RATIONAL FOR THE STUDY

Though the use of bed nets has been in practice for some years now, and it is an important method for controlling malaria, adherence to its use seems to be a problem. Trials of ITNs in the 1980's and 1990's showed that ITNs reduced deaths in young children by an average of 20%. (3). Unfortunately, ITNs can be expensive for families at risk of malaria, who are amongst the poorest in the world, and cost is not the only barrier to their effective use. Often people who are unfamiliar with ITNs, or who are not in the habit of using them, need to be convinced of their usefulness and persuaded to re-treat their nets with insecticides on regular basis. In some areas where mosquito nets are already widely used, it has been estimated that less than 5% are re-treated to achieve their expected impact. WHO has worked with mosquito net and insecticide manufacturers to make re-treatment as easy as possible. However, the best hopes lies with newly developed, long-lasting treated nets which may retain their insecticidal properties for four to five years of their lifespan of the net thus making retreatment unnecessary. (28).

The study will help us to identify the reasons for lack of adherence to the use of the ITN, and to address them appropriately, thus contributing to the efforts to control malaria by improving adherence levels among carers and mothers of children under 5years. The protective effect of bed nets will be strongest if they are used by a high

proportion of the population at risk and this study may help to bring out the loopholes and find ways to overcome them.

1.5 AIM

To investigate why some parents /carers of children under five years old at the 37 Military Hospital out-patients department use bed nets and others don't and to develop strategies that will identify and differentiate their reasons.

1.6 GENERAL OBJECTIVES

To identify factors and characteristics of parents/carers of children under five years old that affects use of bed nets for their children at the 37 Military Hospital paediatrics out-patients department

1.6.1 Specific Objectives

- ❖ To assess the current knowledge, attitude and practice of the use of bed nets by carers/parents for children under 5 years old who visit the paediatrics out-patient department, (POPD) at the 37 Military Hospital.
- ❖ To determine the level of adherence to the use of bed nets by carers of children under 5 years by using a questionnaire.
- ❖ To document any reported cases of frequent malaria attacks in spite of the use of bed nets by carers for patients under 5 years at the POPD 37 Hospital.

- ❖ To determine the affordability of the bed nets (insecticide treated) by carers and parents.

CHAPTER TWO

2.0 METHODOLOGY

2.1 STUDY AREA/SAMPLE

The paediatrics out-patient department (POPD) of the 37 Military Hospital is situated on the ground floor of the round pavilion where all the other out-patients department for the various medical specialities are situated (found). The department is manned by 4 female pediatricians and 10 nurses with a daily out-patient of 100.

2.1.1 SAMPLING

2.1.1.2 Study Population

The study population included both mothers and carers of all ages 14 years and above. A cross sectional study was conducted at the out-patients clinic on children under 5 years old who have had malaria within the past 6 months.

And this was made up of;

Caregivers aged 14 years old and above. This could be

- the mother,
- the grandmother,
- other caregivers.

2.1.1.3 Sample Size Determination

Within 20 days, 500 mothers/carers were chosen at the POPD, out of whom only 200 were interviewed using the questionnaire. The criteria for choosing the 500 were whether or not the child had had malaria within the past 6 months. If the answer is in the affirmative, then they were included in the sample. Otherwise they were excluded. Everyday an average of 25 people within this category was chosen within a period of 20 days. Out of the initial sample of 25 a day, 10 of them are chosen daily at random for the next 20 days.

2.1.1.4 Sampling Method

The method of sampling used was the *stratified sampling*. It is the process of grouping members of the population into relative homogenous subgroups before sampling. This is a method of sampling from a population when sub populations vary considerably. It is advantageous to sample each sub population independently. The strata should be mutually exclusive, every element in the population must be assigned to only one stratum, the strata should also be collectively exhaustive, no population element can be excluded. Then random or systematic sampling is applied within each stratum. This often improves representativeness of the sample by simply reducing sampling errors.

A total sample of 200 respondents over 20 days was allocated to 4 trained personnel, thus 10 respondents were interviewed daily. The respondents were

interviewed by the trained personnel who administered the questionnaire to them verbally. The answers were then recorded. The questions were translated into the Akan and Ga languages for the benefit of non-English speakers. Each trained personnel interviewed between 2 and 3 patients on a daily basis.

2.2 DEVELOPMENT AND VALIDATION OF SURVEY INSTRUMENT

2.2.1 Training of Research Assistants

Four experienced field workers were recruited to help with the administration of the questionnaires at the POPD. A training session was held for them and each of the questions was explained thoroughly to them to ensure that they administer the questionnaires appropriately as directed by the principal investigator. They were taken through how to properly fill the questionnaire in order to avoid uncompleted questionnaires being tended in.

2.2.2 Study Variables

The under-listed variables were used in the preparation of the questionnaire

1. age of respondent
2. gender
3. educational level
4. religion
5. marital status
6. health seeking behavior with respect to malaria
7. knowledge of signs of malaria

8. awareness of bed nets for malaria control
9. use of bed nets for malaria control
10. cost of bed nets

2.2.3 Pre- Testing and Review of Instrument

Questionnaires were pre-tested at the same area of study three months earlier. Mistakes and omissions which came up were appropriately corrected. Questions which appear to be sensitive were rephrased.

Responses to the questionnaires were critically examined at the end of each data collection session. This is to ensure completeness and consistency. The response were then coded and captured in Excel for analysis.

2.3 DATA COLLECTION

The data collection technique and tools used in the study was

- a questionnaire,
- four trained workers who helped with the administration of questionnaire,
- two hundred respondents (carers and mothers) of children under the age of five attending the PODP at the 37 Military Hospital.

2.3.1 Quality Control Measures

Some questions were orally translated into the Ga and Twi languages and standardized to ensure uniformity of data collection. This was necessary since some

of the respondents could not express themselves fully in the English language. Experienced field workers were used and all administered questionnaires were critically examined at the end of each daily session. Once a week a filled questionnaire was randomly picked by the principal investigator and the data captured cross-checked by actually self administering the questionnaires again to the respondent.

2.4 ETHICAL CLEARANCE

Ethical clearance was obtained from the Ministry of Defense through the 37 Military Hospital Review Board before commencement of the study. Consent was also obtained from the Head of Paediatrics Department and NOIC Paediatrics Department, 37 Military Hospital.

The rationale for the study was explained to prospective respondents and they were at liberty to either participate or not. Informed consent was obtained from each respondent.

2.5 DATA PROCESSING AND ANALYSIS

Responses to questionnaires were critically examined at the end of each data collection session. This was to ensure completeness and consistency. At the end of the data collection, responses were coded and captured in Excel. This data was then analyzed to deduce the results and findings of this research.

2.5.1 Limitations

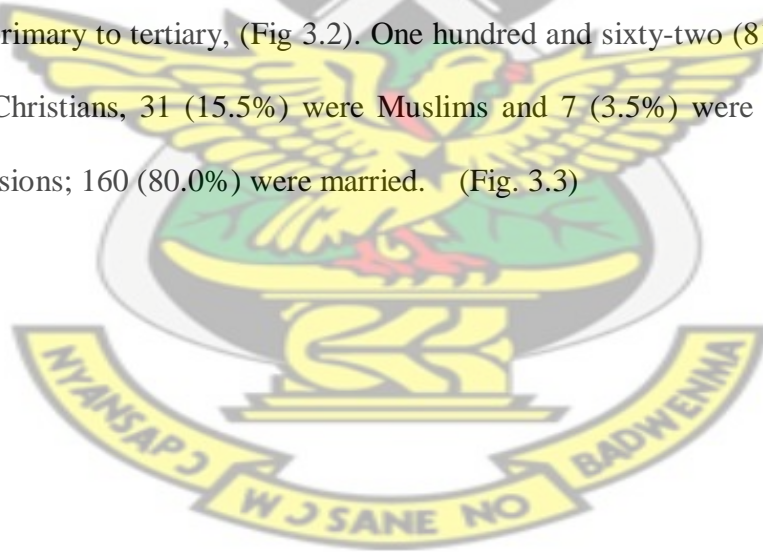
There is some level of illiteracy among the caregivers and this could reflect in false ages being given. There was also an amount of reservation especially in answering questions relating to why they don't have bed nets.

CHAPTER THREE

3.0 RESULTS

3.1 SOCIO-DEMOGRAPHIC DATA

A total of 200 respondents consisting of 26 males, (13.0%), and 174 females, (87.0%) were interviewed. The youngest and oldest respondents were aged 14 and 40 years respectively. Majority of the respondents were between the ages of 20-39 (Fig. 3.1). Also 187 (93.5%) respondents have had some level of education ranging from primary to tertiary, (Fig 3.2). One hundred and sixty-two (81.0%) respondents were Christians, 31 (15.5%) were Muslims and 7 (3.5%) were of other religious persuasions; 160 (80.0%) were married. (Fig. 3.3)



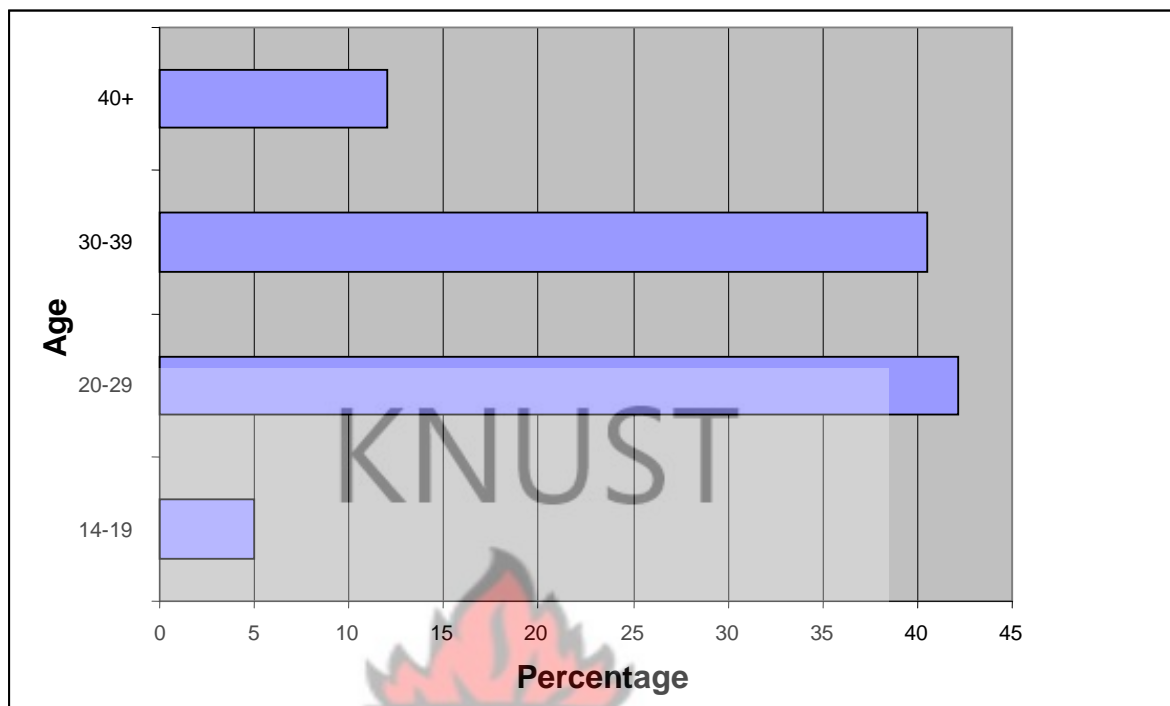


Fig: 3.1: Age Groups of Respondents

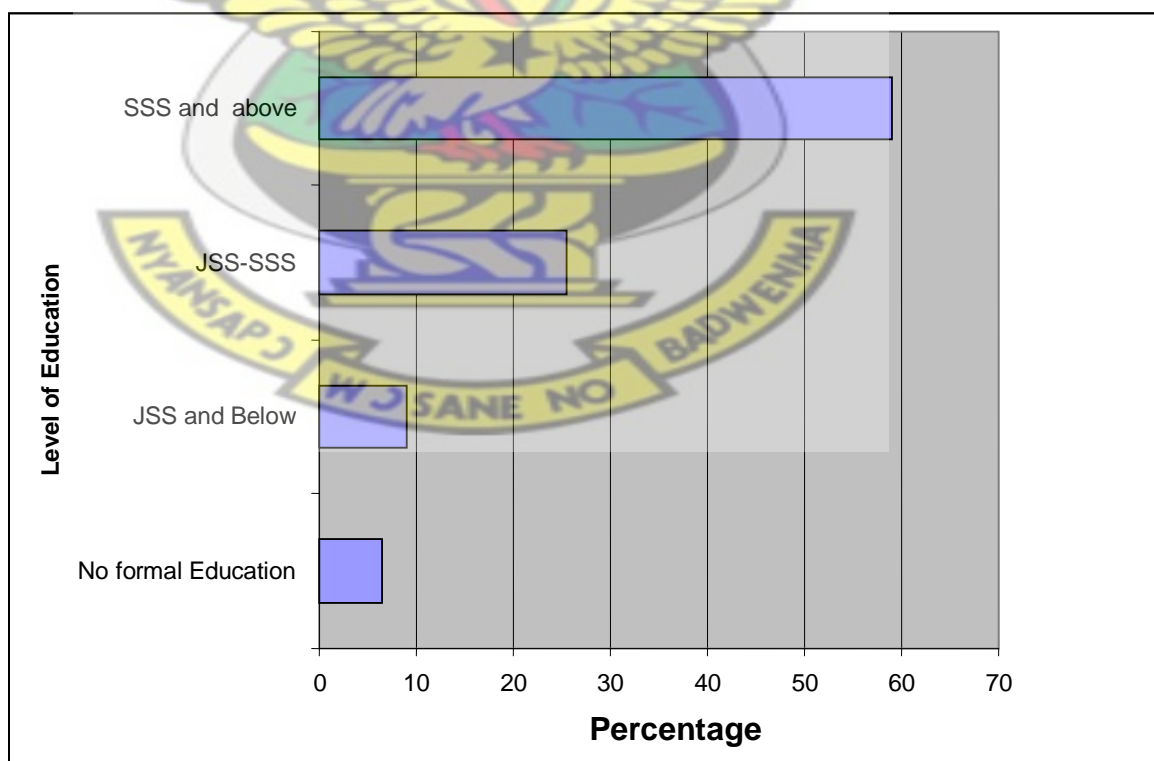


Fig: 3.2: Educational Background of Respondents

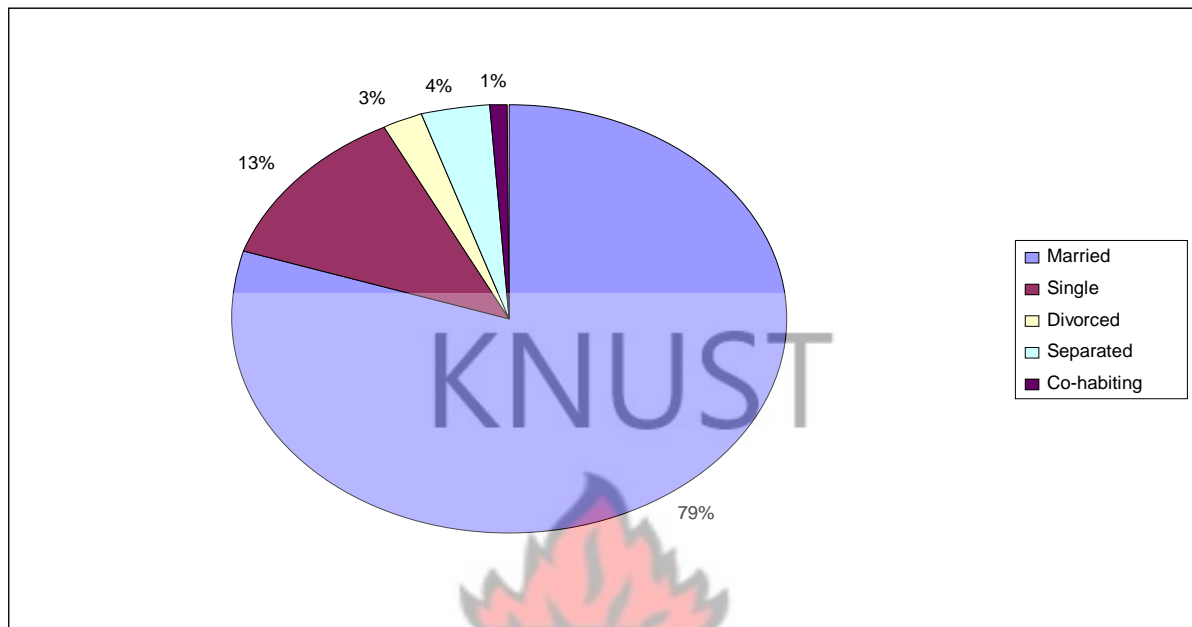


Fig: 3.3: Marital Status of Respondents

3.2 KNOWLEDGE AND PERCEPTION ON MALARIA CONTROL.

3.2.1 Malaria as a concern

One hundred and ninety (95.0%) indicated that malaria was of concern to them. The commonest reason why malaria was of concern was because if untreated could lead to death. (Fig. 3.4). The other 5% indicated that they did not have a problem with malaria. The common characteristic among that 5% is that they fall within the group that have no formal education, and that may explain their position.

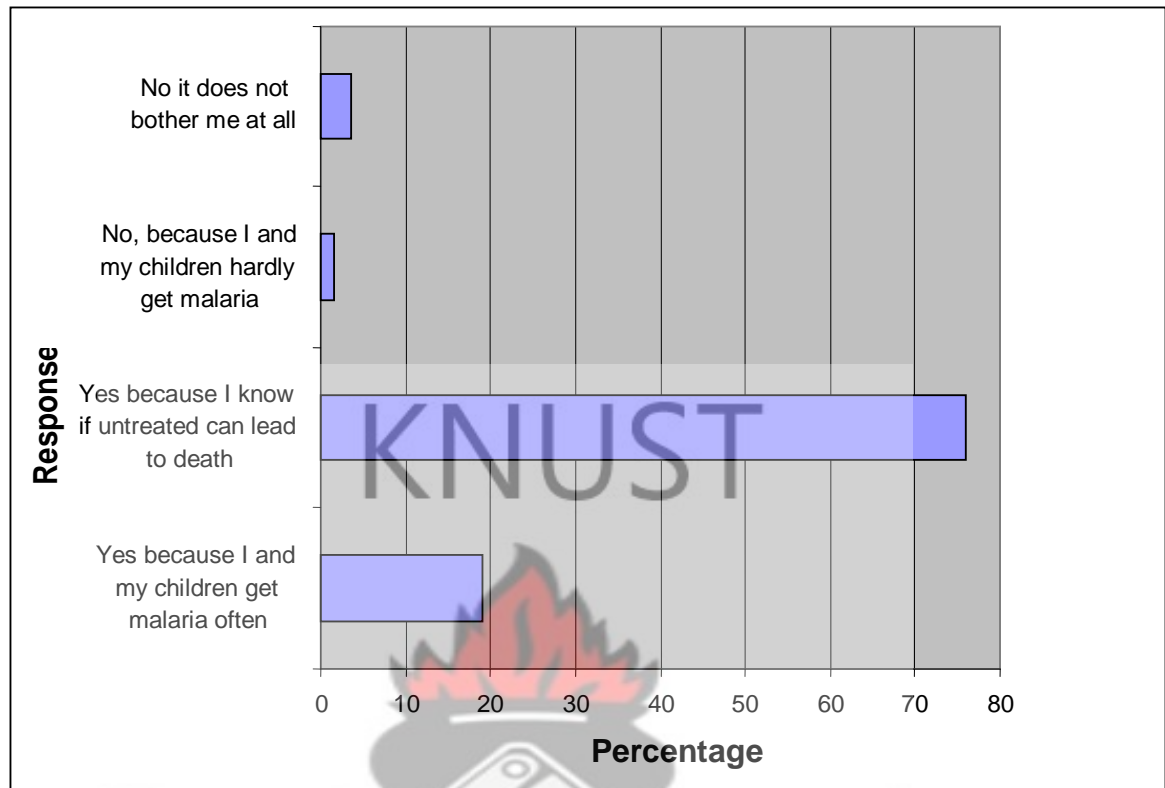


Fig: 3.4: Malaria as a concern

3.2.2 Community's perception about the causes of malaria.

The commonest cause of malaria given by respondents was by mosquitoes 182 (91.0%). (Fig 3.5). The remaining 9% believe that malaria is caused by other conditions outside mosquito bites. Among the reasons given for malaria causation were unhygienic surroundings, working without rest, heat and intake of starchy foods. Most of these people have very little education.

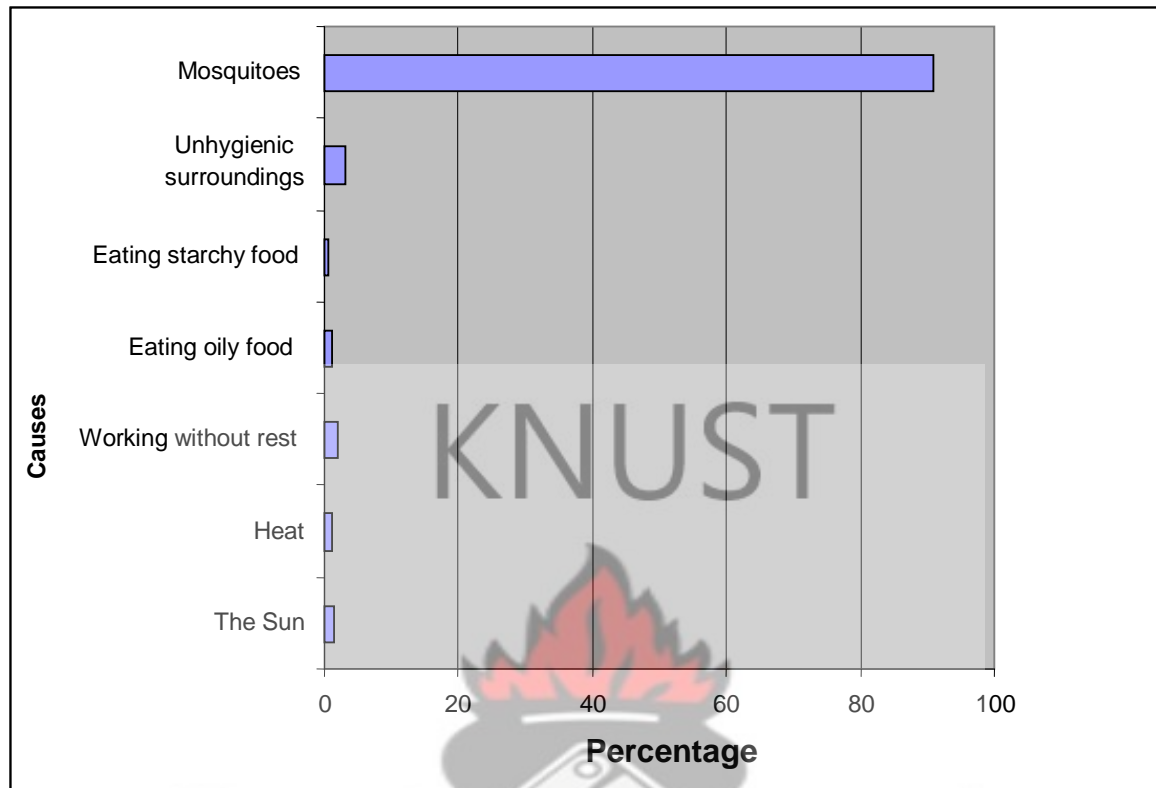


Fig: 3.5: Perceived causes of malaria.

3.2.3 Perceived signs and symptoms of malaria

The common perceived signs and symptoms were headache 30 (15.0%), fever 26 (13.0%), loss of appetite 24 (12.0), and body pains 20 (10.0%). (Table 3.1).

Table 3.1 Perceived symptoms of malaria.

	Frequency	Percentage

Headaches	30	15.0
Fever	26	13.0
Loss of appetite	24	12.0
Body pains	20	10.0
Yellow coloured urine	20	10.0
Bitterness in mouth	20	10.0
Dizziness	18	9.0
Vomiting	16	8.0
Chills	14	7.0
Cough	6	3.0
Others	6	3.0
Total	200	100.0

3.2.4 Frequency of malaria occurrence

Table 3.2 indicates the frequency of malaria occurrence. 42.5% (which is quite a large proportion) indicated that their children suffer from malaria at least twice a year, 26.5% suffer from malaria three times or more within a year, 8.5% suffer almost every month from malaria. The 22.5% cannot tell the frequency of malaria occurrence.

Table 3.2 Frequency of malaria Occurrence

Occurrence	Frequency	Percent	Valid Percent	Cumulative Percent
Almost every month	17	8.5	8.5	8.5
Twice a year	85	42.5	42.5	51.0
Three or more times a year	53	26.5	26.5	77.5
Don't know	45	22.5	22.5	100.0
Total	200	100.0	100.0	

Furthermore a high proportion of caregivers indicated that the last time their child was diagnosed of malaria was the month before. (Fig. 3.6)

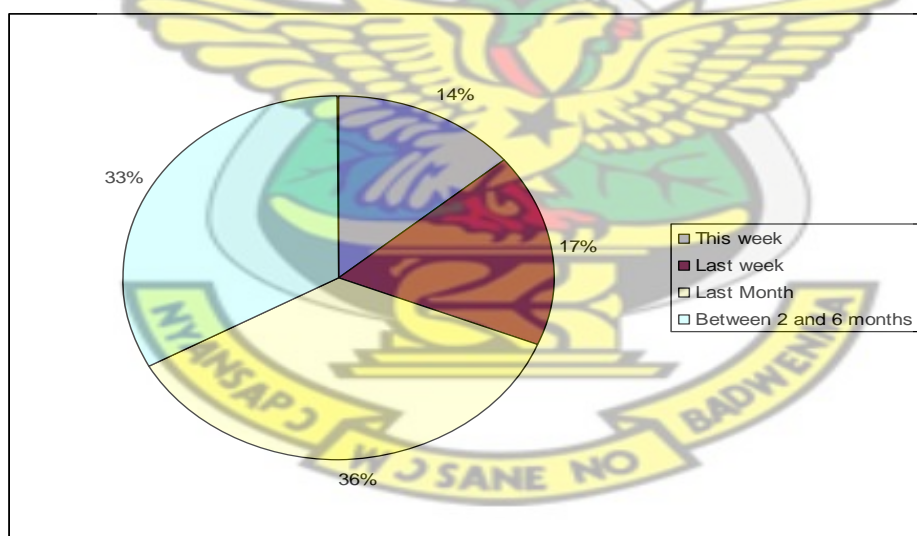


Fig: 3.6: The last time a child was diagnosed of malaria

3.3 METHODS OF MALARIA PREVENTION BY RESPONDENTS

A high proportion of respondents used Mosquito coils (30%) and nets on windows and doors (31%) as methods of prevention of malaria (Fig. 3.7)

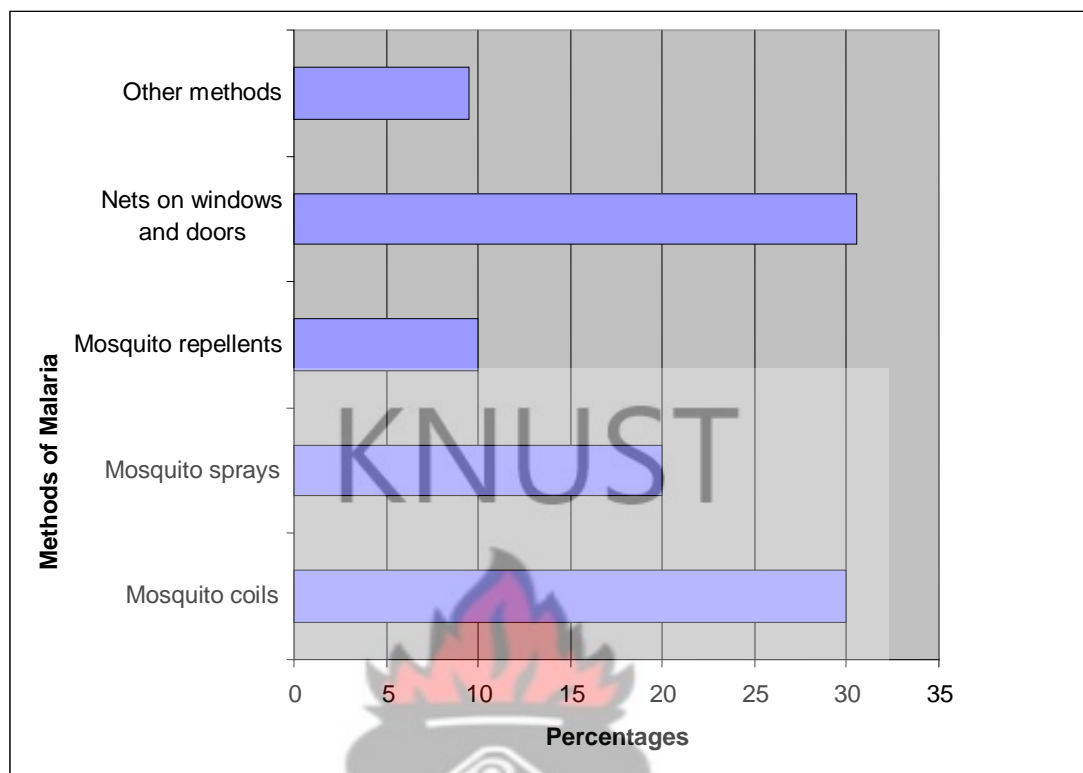


Fig: 3.7: Methods of Malaria Prevention

3.4 MOTHERS AND CARERS AWARENESS OF BED NETS (ITNS AND N-TNS)

One hundred and ninety (95.0%) of respondents indicated they have heard of bed nets. The common source of information about bed nets was by health workers, TV and radio as indicated by Fig. 3.8. Furthermore, 174 (87%), have seen and handled bed nets, even though some of them do not possess bed nets. Out of one hundred and forty eight respondents who possess bed nets 67, (45.5%) of them use the bed nets sometimes, 55 (37.0%) indicated that they use bed nets all the time, and 26 (17.5%) respondents said they have never used bed nets, even though they possess them.

With regard to reasons why respondents do not have bed nets, 20 (40.0%) just have not thought about it, 18 (34%) say it is too expensive and cannot afford it, 14 (26%) think it is not necessary.

Fig. 3.9 indicates the perception of respondents on the use of bed nets as a preventive measure

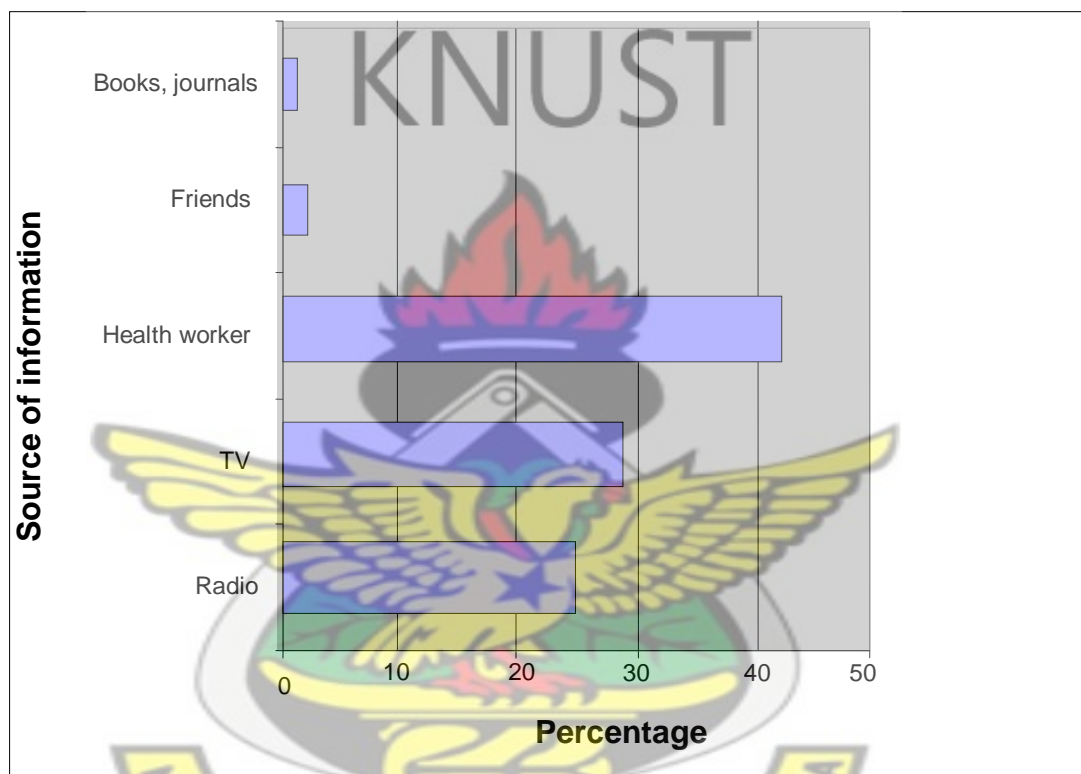
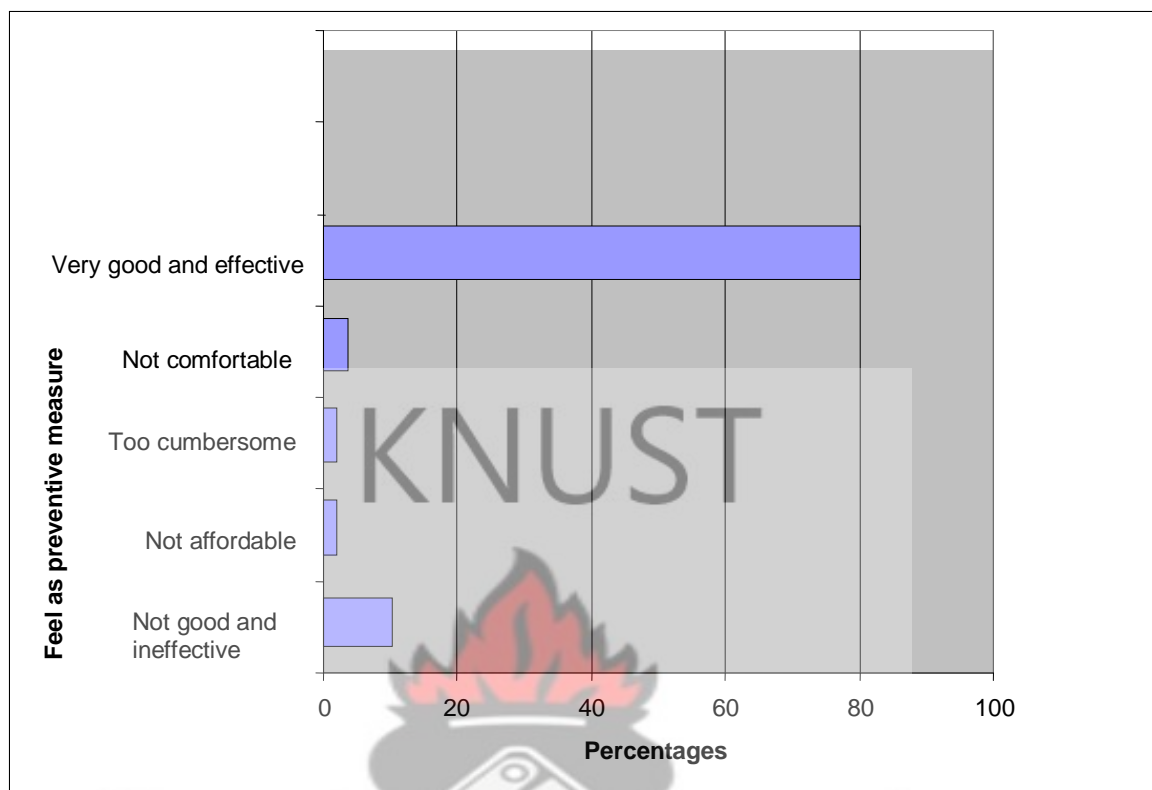


Fig: 3.8: Source of information on bed nets



Fig; 3.9: The perception of respondents on the use of bed nets as a preventive measure

3.4.1 How the availability of bed nets influence its use.

A large proportion of respondents, that is 159, (79.5%), will consider the use of bed nets if it were readily available, 33 (16.5%) will use it sometimes and 8 (4.0%) do not believe in it.

3.4.2 Period of use of bed nets

The majority of 89 (60.0%) respondents have been using bed nets for more than two years. Twenty-four (15.5%) respondents have used it for less than six months, 19 (13.0%) respondents have used it for less than one year and 16 respondents (11.5%) have used it for less than three months.

3.4.3 Impregnated bed nets with insecticides

Eighty-three (56.0%) respondents possess insecticide treated bed nets, 38 (26.0%) do not know if their bed net is impregnated with insecticides, and 27 (18.0%) definitely do not have any insecticide in the bed net. Out of these 55 (37%) respondents have treated the bed nets with insecticide by themselves and 93 (63%) have never tried it.

3.4.4 Advantages of using ITNs over N-TNs.

One hundred and forty-nine (78.5%) respondents, think ITNs have advantage over N-TNs. Twenty-nine (15.5%) think there is no advantage and 12 (6.0%) say they are all the same.

3.4.5 Effectiveness of bed nets.

One hundred and two (69.0%) respondents indicated a decrease in the incidence of malaria in their children since using bed nets, 33 (22.5%) have not noticed any change, and strangely 13 (9.0%) have noticed an increase in the incidence of malaria, a worsening condition.

3.4.6 Recommendation of the use of bed nets to other mothers and carers by mothers who use bed nets.

Further analysis of the 148 respondents who used bed nets indicated that 118 (80.0%) of mothers and carers would recommend the use of ITNs to others and 30 (20.0%) will not.

3.5 PRICING AND AFFORDABILITY OF BED NETS.

3.5.1 Affordability of bed nets

Although majority of the respondents work and earn a living, more than (55%) feel that the bed nets are expensive.

3.5.2 Willingness / ability to pay

Of the 200 respondents, 37 (18.5%) said they will be willing to pay below GH¢ 1.00; 71, (35.5%) will be willing to pay between GH¢ 1.00 and GH¢ 2.00. Thirty-six (18 %) will be willing to pay between GH¢ 2.00 and GH¢ 3.00; twelve, (6.0%) will be willing to pay above GH¢ 3.00 and forty-four, (22.0%) said they would want the drug for free. Almost a quarter of the respondents want the bed net for free and the rest who are ready to pay still are not willing to pay the actual price of GH¢ 6.00.

Table 3.4 : Ability to pay

GH¢	Frequency	Percent	Cumulative Percent
Valid Below 1.00	37	18.5	18.5
1.00 - 2.00	71	35.5	54.0
2.00 – 3.00	36	18.0	72.0
Above 3.00	12	6.0	78.0
Free	44	22.0	100.0
Total	200	100.0	

CHAPTER FOUR

4.0 DISCUSSION AND CONCLUSIONS

4.1 SOCIO-DEMOGRAPHIC CHARACTERISTICS.

Socio-demographic data provides the basic background of the respondents. Majority of the respondents in this study were young, being mostly between 20 and 39 years.

Educational level also depicts how well information is assimilated. It may be argued that the higher the educational level, the better the awareness of issues concerning the children, the need for malaria prevention and the important role of bed nets play as a preventive measure. On the other hand, awareness of issues could simply be attributed to individual's interest, access to information and position in society.

From the data collected it seems most of the respondents have had some level of education with majority educated up to the S.H.S and above. Marriage provides some form of stability in the society as well as encourages procreation. More than 80% of the respondents are either married or have been married before.

4.2 KNOWLEDGE AND PERCEPTION ON MALARIA.

Majority of respondents felt malaria was of concern to them and this was equally so in both men and women. Even though the number of men were fewer comparatively, they all considered malaria as a threat.

Education brings enlightenment, and so the more educated the people, the more they are likely to know about the implication of not preventing malaria especially in children.

Over 90% of the respondents in the community believe that the cause of malaria is basically from mosquito bites. This knowledge about the causes of malaria was quite homogenous amongst the various age groups. This may be attributed to the fact that the majority of respondents are young and educated, 83% are between ages 20-39 and 84.5% are J.S.S graduate and above. The indication then is that due to the level of education and age group of majority of respondents there are only a few cases where the causes of malaria is attributed to myths and other perceptions including sun and diet.

Almost all the respondents were able to identify already established signs and symptoms of malaria. Some of these include headache, bitterness in mouth, loss of appetite, vomiting and chills.

This is most encouraging because malaria has a high incidence of morbidity and mortality especially in children less than 5 years. This underscores the fact that when care givers are given the necessary information about how to prevent malaria especially by using ITNs, they will embrace it rapidly which will go a long way to decrease morbidity and mortality.

4.3 USE OF BED NETS FOR MALARIA PREVENTION.

More than 80% of the respondents in the survey feel that the use of bed nets as a preventive measure is very good and effective. The rest gave various reasons which prevent them from using bed nets; these reasons range from not being comfortable, being too cumbersome, not affordable and ineffective. These concerns can be addressed with more education.

4.4 ADHERENCE TO ITNs

From the data collected it appears that 26 (17.5%) respondents have never used ITNs and considering the fact that 67 (45.5%) only use it sometimes, it is indicative that more than half of the respondents do not use ITNs consistently, and this may also explain the high rate of morbidity in children.

However amongst those who have heard of bed nets, those with higher level of education, S.H.S and above have a higher level of awareness with regards to ITNs as an effective preventive tool for malaria.

About one hundred and fifty-seven, (78.5%) of those who are aware of the effectiveness of bed nets as a preventive tool in malaria also know the advantages of using ITNs over N-TNs. The main sources of information about the preventive use of bed nets (ITNs and N-TNs) in malaria were from health workers, radio and television whilst a few got their information from friends.

Out of 200 respondents, 148 have bed nets and this is quite appreciable. In the light of this data, efforts have to be made to find ways of encouraging carers and mothers to use bed nets, not forgetting the fact that 26 of those who owned bed nets have never used them, and 67 only use them sometimes.

From the data collected from the POPD it seems most people who claim they are aware of the existence of bed nets do not really know exactly why they must use them.

One hundred and twelve of the 200 respondents have their nets impregnated with insecticides; 75 know how to do the treatment themselves. The majority of carers, think there is advantage in the use of ITNs over the use of N-TNs. One hundred and thirty-eight, can testify to a decrease in the incidence of malaria in their children. Carers especially those who have experience with bed nets are prepared to recommend the use of bed nets to other mothers or carers.

As urgently as the nation may want to encourage the use of bed nets in the prevention of malaria, care should be taken to educate people well, especially on the proper use of bed nets and its advantages, the difference between ITNs and N-TNs, the advantages of ITNs over N-TNs, thus encouraging more people to use ITNs.

4.5 PRICING AND AFFORDABILITY OF BED NETS.

Perhaps one most important factor that most people look out for whenever there is an introduction of a new service or products is the cost of the product. No matter how good and beneficial that product is, if the product is not affordable, most people will not patronize it. This is perhaps more so in the third world countries and Ghana is no exception.

For the purpose of this study the respondents were told the cost of ITNs were between GH¢ 5.00 - GH¢ 6.00. One hundred and fifty-nine, of the respondents said they will consider using bed nets if they were readily available. Even though 178 of respondents work or earn a living, 111 considered ITNs to be expensive. The majority want it cheaper than the actual price.

Ordinarily it would appear that those who are greatly concerned about preventing malaria especially in children under 5yrs are those who will be more likely to be aware of and willing to pay for this product to reduce the incidence of malaria and morbidity and mortality due to malaria in their children. However the data shows that this is not necessarily the case, which may be due to lack of information amongst respondents.

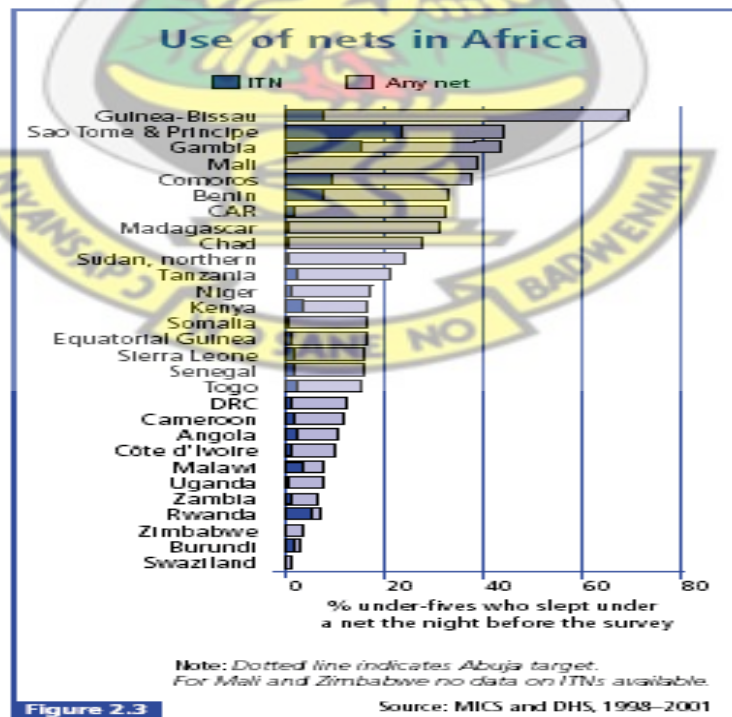
It may also be assumed that since ITNs are an excellent preventive tool in malaria, most health workers will be aware of this and give information and education to the respondents visiting the facilities, this does not however appear to be the case since

data collected suggested that less than half of the respondents had their information from health workers.

What is needed now is a dedicated approach to information dissemination of ITNs to facilitate its acceptance which will cause a decrease in morbidity and mortality due to malaria.

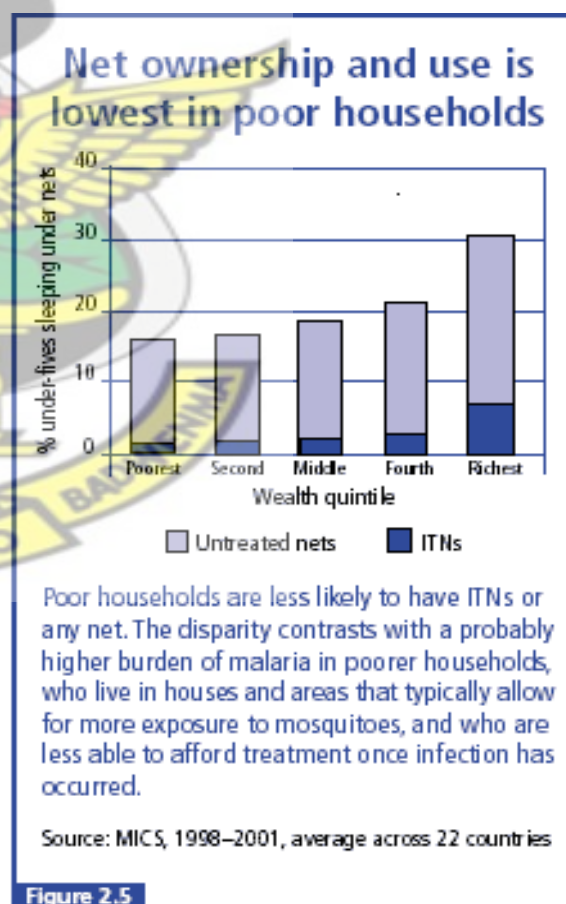
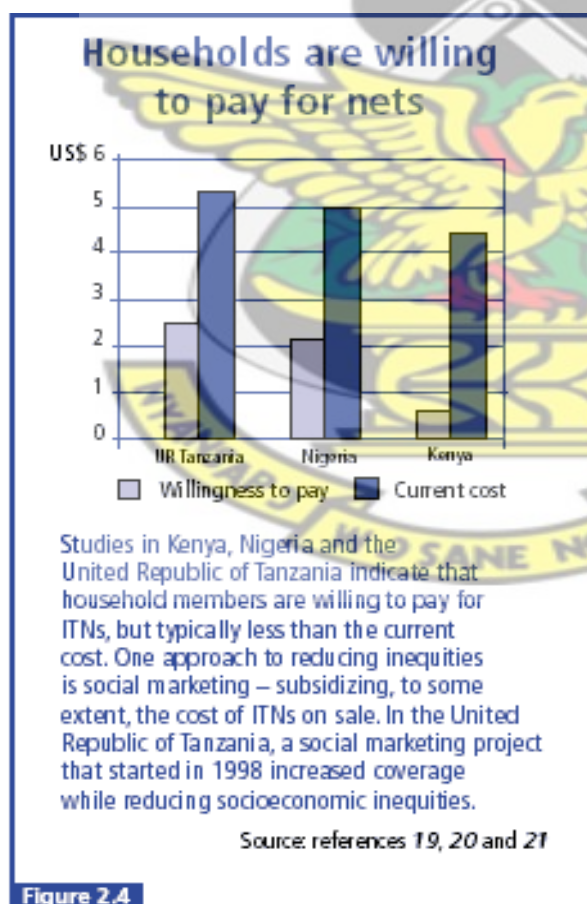
4.6 COMPARISON OF RESEARCH WORK WITH SIMILAR WORKS DONE IN OTHER MALARIA ENDEMIC AREAS IN THE AFRICA.

Similar work had been done in other malaria endemic regions in Africa on the use of ITNs as a preventive tool in malaria control. There are similarities between this work and what has been done by MICS and DHS where the cost of ITN was shown to be a barrier to their widespread use.



In twenty-nine countries surveyed between 1997 and 2001, a median 13% of households possess one or more nets (range 1.1-54%). A median 1.3% (range 0.2-4.9%) of households surveyed in three countries own at least one ITN (16). The proportion of under-5s sleeping under nets is also low - about 15% across 28 countries surveyed. Even fewer children (less than 2%) sleep under ITNs. Only two countries, the Gambia and Sao Tome and Principe, reported ITN use rates of more than 10% (see Figure 2.3 above).

A major barrier to net ownership is poverty. The most common reason cited for not possessing a net is lack of money: the price of a net represents a large proportion of the income of a poor household, (see Figs. 2.4 and 2.5)



There is the knowledge and practice of the use of bed nets in other countries in the Africa where malaria is endemic. The following conclusions from the above research confirm that affirmation;

- That the use of ITN is important as a preventive tool in the prevention of malaria.
- That even though people may be willing to pay for ITNs they are more willing to pay less than the current cost.
- That high cost of ITNs is a major cause of lack of adherence to ITNs by the most vulnerable groups.

The results obtained from the research on the use of bed nets by mothers/carers of children under five years extend the literature on the research area. There is documentation of frequent malaria attacks in spite of the use of ITNs. There are also documented cases of people who do not perceive any change in the incidence of malaria while using ITNs.

4.7 RELEVANCE AND IMPLICATION OF THE RESULTS TO PHARMACY PRACTICE.

Malaria is a disease which is endemic to in the sub-region.

Our role as pharmacist in this research is at the primary health care level, where we must educate patients and emphasize on prevention of malaria rather than treatment.

Normally, the patient's first point of call when infected with malaria is the pharmacy. The pharmacist can thus play a good role in educating the patients on the benefits of using bed nets.

As pharmacists, especially in community practice and for primary health care our focus should be more on prevention of malaria and giving adequate information to the community. One of the effective ways of preventing malaria is by the use of ITNs especially in children under 5 years and pregnant women who are most vulnerable.

ITNs are sold in pharmacies and can be easily accessed by those who are prepared to purchase them.

ITNs are a natural alternative to toxic chemical sprays as a method of prevention and they are comparatively cheaper than treating malaria. High cost are still a major barrier to the effective use of combination therapy for treatment, therefore as pharmacists our role as primary health care providers is in prevention and undoubtedly ITNs are very effective if used well.

4.8 LIMITATIONS

Malaria is endemic in the sub-region and therefore a larger sample size could have given us a more accurate representative of the adherence of and the use of bed nets. However due to lack of resources the research had to be conducted in only a small

locality, just the POPD and not even in other out-patient department where children under 5 years are attended to, for example during ante natal clinics.

With sufficient finance and logistics the research could have covered samples from various districts and even samples from various regions of the nation.

Further work could be done in this area where we include other out-patient departments in the hospital like the public health department where ante-natal clinics are conducted.

Also research in this area could be done in selected communities and in localities among the population where malaria is most endemic, and endeavouring conducting the project within the rainy season.

4.9 CONCLUSIONS

From results, majority of mother/carers say malaria is of concern because they indicate that if untreated may lead to death. Ninety-five percent of participants have knowledge about bed nets, the majority from health workers, the media and although some may not be using it, most think that as a preventive measure in malaria prevention it is very good and effective.

The fact that ITNs are not readily available to mother/carers due to high cost of and lack of adequate information may account for non adherence to the use of bed nets, many will consider using it if it were readily available. One hundred and forty-

eighty participants have been using ITNs and they make up 74% of the sample population of 200. Adequate education and other measures of intervention to make it accessible for all, will certainly improve adherence levels.

This work has documented 12 (6.0%) cases where mothers/carers indicated increase in the incidence of malaria using bed nets. After adequate education and information in the use of ITNs it may be possible to deal with this situation.

Although over 178 of participants work and earn a living, 111 of the total sample population indicated that ITNs are too expensive. There may be the need therefore to bring down the price of ITNs from the current price of between GH¢ 5.00 and GH¢ 6.00 to a price that may be affordable to the majority.

4.10 RECOMMENDATIONS

4.10.1 Malaria control programme /re-launching of bed nets.

The Malaria Control Programme should encourage the District Health Management Teams in all Districts to organize workshops and campaigns in their various communities to educate them on the benefits and use of ITNs. This must be thoroughly done and a feedback given to the Malaria Control Programme.

4.10.2 Cost to Government

For ITNs to be totally accepted, government might need to address issues relating to the cost of ITNs. ITNs should be subsidized to make them more affordable to all. This will ensure higher level of patronization and adherence.

ITNs should be made available free to the rural poor who are most at risk and cannot afford to pay for the ITNs. Government may help by putting in place a special programme to help the rural poor to acquire ITNs. The distribution of ITN should be integrated into the immunization programme.

4.10.3 Private sector participation.

In conducting workshops, educational seminars and awareness campaigns, the private health institution facilities should not be left out and personnel from these facilities should be involved right from the start.

4.10.4 Other Recommendations

Organizing public campaigns in malaria endemic areas.

- The malaria control programme must employ all means of communication using various media like radio talk programmes, television interviews and adverts especially in local languages. Fliers and posters depicting the positive effect of the use of ITNs and the proper way to use bed nets must be put up at health centres, schools, markets places, churches and mosques

in order to raise and maintain awareness and this must be sustained over a long period.

- The malaria control programme, NGOs and other private organization must lobby for reduction or waiver of taxes and tariffs on mosquito nets, netting materials and insecticides.
- Stimulate local ITN industries and social marketing schemes so that nets are available at a price everyone can afford.
- Capitalization on the potential of newly developed long-lasting treated mosquito nets by encouraging parent/carers to acquire long lasting insecticide treated nets. This must be taken up by the government agencies.
- Universal and sustained provision ensuring that all children under 5 years and pregnant women have the access to ITNs, and that this provision can be sustained in the long term.
- Covering the majority through both ANC and EPI. Through the ANC and EPI most households with children under 5 years could obtain ITN. This could effectively help to deliver two ITNs per household. However when funds are sufficient and only one ITN can be given per household then children under one year and therefore ANC should be prioritized over children 1-4 years and EPI.
- Reaching the minority who are out of reach of routine health services through outreach and community based systems. Accessing this minority of pregnant women and children under one year is a priority.

REFERENCES

1. WHO's Special Programme for Research and Training in Tropical Diseases. (TDR). IDRC & TDR 1994.
2. Net Saves Lives: US Centres for Disease Control and Prevention (CDC) copyright 2008, Nothing but Nets.
3. Roll Back Malaria, WHO, United Nations children's Fund: World Malaria Report 2005, Geneva; WHO 2005.
4. Abuaku BK, Koram KA, Binka FN: Anti- malarial Prescribing Practices: A Challenge To Malaria Control In Ghana. Med Princ Pract 2005, 14: 332-337, Pub Med Abstract
5. Asenso Okyere WK, Dzator JA: Household Cost Of Seeking Malaria Care, A retrospective study of two districts in Ghana .Soc Sci Med 1997, 45: 659-667.
6. Agyapong IA, Manderson L: Mosquito Avoidance And Bed Net Use In Greater Accra Region, Ghana J. Biosoc Sci 1999, 31: 79-92.
7. Langelar C et al; Insecticide Treated Bed net and Curtains for Preventing Malaria. Cochrane Database System 2001; Rev 2004.
8. Jones G, Steketee RW, Black RE, Bhutta Z A., Morris S S, Bellagio Child Survival Study Group: How many child deaths can we prevent this year? Lancet 2003, 362:65-71.
9. Binka FN, Mensah OA, Mills A: The cost effectiveness of permethrin impregnated bed nets in preventing child mortality in Kassena-Nankana District of Northern Ghana. Health Policy 1997 41:229-233
10. Roll Back Malaria, WHO, UNICEF: The African Malaria Report 2003: WHO; 2003.

11. Tanzania NGO; Alliance Against Malaria, Casting a Wide Net: How NGO promote Insecticide Treated Bed Net, Washington DC, :The Core Group; 2004
12. Adongo PB, Kirkwood B Kendall C: How Local Community Knowledge About Malaria Affects Insecticide- Treated Net Use In Northern Ghana. Trop Med Int Health 2005, 10: 366-378.
13. Okrah J, Traore C, Pale A, Sommerfield J, Muller O,: Community Factors Associated with Malaria Prevention by Mosquito Nets: An explanatory study in rural Burkina Faso. Trop Med Int Health 2002. 7: 240-248.
14. Terra de Souza AC, Peterson KE, Andrade FMO, Gardener J, Ascherio A,: Circumstances of post-neonatal deaths in Ceara, ,Northeast Brazil; Mother's Health care-seeking behaviors during their infant fatal illness. Soc Sci Med 2000; 51:: 1625-1693
15. Agyapong IA, Manderson L, The diagnosis and management of fever at household level in the Greater Accra region, Ghana. Acta Trop 1994,58: 317-330
16. Agyapong IA: Malaria ethnomedical perceptions and practice in an Adangbe farming community and implications for control. Soc Sci Med 1992, 35: 131-137.
17. Daeresa W, Ali A, Enquoselassie F; Knowledge, Attitude and Practice about malaria, The mosquito and anti malaria drugs in a rural community Ethiop J. Health Dev 2002 17;99-104.
18. Ahorlu CK', Dunyo SK, Aferi EA, Koram KA, Nkrumah FK': Malaria related beliefs and behavior in southern Ghana, Implications for treatment,prevention and control. Tropical Medicine Int. Health 1997, 2: 488-499.

19. Mwenesi H, Harpham T, and Snow RW: Child malaria treatment practices among mothers in Kenya. Soc Sci Med 1995, 40: 1271-1277.
20. Winch PJ: The role of anthropological methods in a community based mosquito net intervention in Bagamayo district, Tanzania. Anthropology in Public Health. Edited by Hahn RA, New York: Oxford University Press; 1999:44-62.
21. WHO. The African summit on Roll Back Malaria, Abuja, Nigeria, 25th April 2000. Abuja: WHO, 2000.
22. World Health Organization, United Nations Children's Fund. Joint statements: malaria control and immunization: a sound partnership with great potential. Geneva, Switzerland: World Health Organization; 2004.
23. D'Alessandro U et al. The Gambian National Impregnated Bed Net Programme: evaluation of effectiveness by means of case-control studies. Transactions of the Royal Society of Tropical Medicine and Hygiene, 1997, 91(6):638-642.
24. Aikins MK, Pickering H, Greenwood BM. Attitudes to malaria, traditional practices and bed nets (mosquito nets) as vector control measures: a comparative study in five West African countries. Journal of Tropical Medicine and Hygiene, 1994, 97(2): 81-86.
25. Obisesan K, Adeyemo A, Fakokwde B: Awareness and use of family planning methods among married women in Ibadan, Nigeria. East Africa Medical Journal 1998, 75: 135-138 Public Medical Abstract.
26. Ghana Statistical Service, Noguchi Memorial Institute for Medical Research, ORC Macro: Ghana Demographic and Health Survey: 2003 Final Report. Calverton, Maryland: GSS, NMIMR, ORC Macro; 2004.

27. Grabowsky M, Nobia T, Ahun M, et al. Distributing insecticide treated bednets during measles vaccination: a low-cost means of achieving high and equitable coverage at low cost. Bull WHO 2005; 83:195—201.
28. Alaii J, Hawley W, Kolczak M, et al. Factors affecting use of permethrin-treated bednets during a randomised control trial in Western Kenya. Am J Trop Med Hyg 2003; 68: 137—41.

KNUST



KNUST

QUESTIONNAIRE

(i) 14 – 19 (ii) 20 – 29 (iii) 30 – 39 (iv) 40 and above

(i) Male (ii) Female

Education level:

(i) No formal education

(ii) JHS and below

(iii) JHS – SHS

(iv) SHS and above

Religion:

(i) Christian

(ii) Moslem

- 62

- (iv) Separated
- (v) Co-habiting

(B) KNOWLEDGE AND AWARENESS

1. Is malaria of concern to you?

- (i) Yes, because I, (my children) get malaria often.
- (ii) Yes, because I know if untreated it can lead to death.
- (iii) No, because I, (my children) and I hardly get malaria.
- (iv) No, it doesn't bother me at all.

2. What causes malaria? (Tick all causes mentioned)

- (i) The sun.
- (ii) Heat.
- (iii) Working without rest.
- (iv) Eating only food.
- (v) Eating starchy food.
- (vi) Unhygienic surroundings.
- (vii) Mosquitoes.
- (viii) Others.

3. Has your child (children) ever suffered malaria?

- (i) Yes
- (ii) No

4. When was the last time your child was diagnosed of having malaria?

- (i) This week.
- (ii) Last week.
- (iii) Last month.
- (iv) Between two and six months.

5. How often does your child get malaria?

- (i) Almost every month.
- (ii) Twice a year.
- (iii) Three or more times a year.

6. What symptoms make you think you have malaria?

- (i) Body pains (ii) chills (iii) headaches (iv) loss of appetite
- (v) Yellow coloured urine (vi) cough
- (vii) Bitterness in mouth (viii) dizziness (ix) fever blisters
- (x) Vomiting (xi) other

7. What do you think you can do to prevent malaria?

- (i) I don't know.
- (ii) By using mosquito coils.
- (iii) Using mosquito sprays.
- (iv) Using mosquito repellents.

(v) Using nets on the windows and doors.

(vi) Using bed nets.

(vii) Other.

8. Have you ever heard of bed nets?

(i) Yes (ii) No

KNUST

9. Have you ever seen or handled a bed net?

(i) Yes (ii) No

10. If yes to (8) above where did you first hear it?

(i) Radio (ii) TV (iii) Health worker

(iv) Friend (v) Books, Journals etc.

11. Do you have a bed net?

(i) Yes. (ii) No.

12. If No, why don't you have one?

(i) It is not necessary.

(ii) It is too expensive, I can't afford it.

(iii) I just haven't thought of it.

(C) **ATTITUDE AND PRACTICE OF CARERS TOWARDS THE USE OF BED NETS**

1. How do you feel about the use of bed nets as a preventive measure?

- (i) It is very good and effective.
- (ii) It is not comfortable.
- (iii) It is too cumbersome.
- (iv) It is not affordable.
- (v) It is no good and ineffective.

2. Have you ever used a bed net?

- (i) Yes, all the time.
- (ii) Yes, sometimes.
- (iii) Never.

3. If it is readily available, would you consider using it daily for your child?

- (i) Yes
- (ii) Sometimes,
- (iii) No, I don't believe in it.

4. When did you start using bed nets?

- (i) less than 3 months
- (ii) less than 6 months
- (iii) less than 1 year
- (iv) more than 2 years

5. Is your bed net impregnated with insecticide?

- (i) Yes (ii) No (iii) I don't know

6. Have you ever treated the bed net with insecticide by yourself?

- (i) Yes (ii) No

7. Do you think there is any advantage in using insecticide treated bednet over the use of non-insecticide treated bed nets?

- (i) Yes (ii) No (iii) they are all the same

8. Have you noticed a decrease in the incidence of malaria in your children since you started using bed nets?

- (i) Yes
(ii) No change
(iii) Incidence of malaria has increased than before.

9. Based on your experience with bed nets, would you recommend its use to mothers and guardians?

- (i) Yes (ii) No.

ECONOMIC FACTORS

1. Do you work / earn a living?
(i) Yes (ii) No
2. Do you consider insecticide treated bed nets expensive?
(i) Yes (ii) No

3. If yes, how much will you be willing to pay for it?
 - (i) Below one Ghana cedi.
 - (ii) Between one Ghana cedi and two Ghana cedis.
 - (iii) Between two Ghana cedi and three Ghana cedis.
 - (iv) Above three Ghana cedis.
 - (v) Bed nets should be free.

