KNOWLEDGE, ATTITUDES, PRACTICES AND PREVENTION OF MALARIA: A STATISTICAL PERSPECTIVE OF KABRAS NORTH DIVISION, KAKAMEGA COUNTY, KENYA

BY

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DECLARATION

This research project is my own work and has not been presented elsewhere for a degree award in any other institution.

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This project report has been submitted for examination with my approval as the university supervisor

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DEDICATION

It is my genuine gratefulness and warmest regard that I dedicate this work to my Dad, the late Alexander Puti Khayechia, who took me to School

ABSTRACT

An elaborate understanding of the Knowledge, Attitudes and Practices (KAP) of particular community can inform the design of Behaviour Change Communication (BCC) campaigns to influence acceptance and use of Malaria control measures. Research to clearly determine what interventions to carry out has not been exhaustively undertaken in Kabras North Division. This study investigated the KAP in relation to malaria prevention and control among households in Kabras North Division, Kakamega County. A community based, cross sectional study was carried out where a stratified random sampling with proportional allocation was used to select 370 representative households. A questionnaire was used to collect information on demographics, knowledge and attitudes towards malaria and its prevention and treatment habits. The data was described using frequency and contingency tables. Chi-square tests are used to test for associations between demographics variables, prevention and control. The results showed that resident of rural Kabras were knowledgeable on malaria, its transmission, its symptoms, how to seek treatment and prevent malaria. However, their attitudes towards malaria and their treatment seeking behaviours varied. Demographic factors like age and education level played a role in their malaria prevention habits. Younger people slept under mosquito nets more frequently than older people, and those with secondary school education slept more under mosquito nets than those with primary education only (Cramer's V = 0.313 and 0.706 respectively). BCC interventions could consider information of importance of early diagnosis, completion of prescribed drugs and possibly personalities and myths surrounding malaria in the locality.

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NOTATION

AIDS Acquired Immune-Defficiency Syndrome. 6

BCC Behavior Change Communication. 2–4, 10

GoK Government of Kenya. 9

HIV Human Immunodeficiency Virus. 6

IMCI Integrated Management of Childhood Illness. 9

IPT Intermittent Preventive Treatment. 9

IRS Indoor Residual Spraying. 9, 10

ITNs Insecticide-Treated Mosquito Nets. 1, 9, 10

KAP Knowledge, Attitudes and Practices. vii, 2, 10

KES Kenyan Shillings. 21

KHIS Kenya Health Information Systems. 2

KNBS Kenya National Bureau of Statistics. 21

MoH Ministry of Health. 1–3

NMCP National Malaria Control Programme. 2–4

NMS National Malaria Strategy. 1, 2, 9

OPD Out Patient Department. 2

SPSS Statistical Package for Social Sciences. 16

Chapter 1

INTRODUCTION

1.1 BACKGROUND

Malaria continues to be the leading killer-disease in Kenya, despite countrywide efforts to eradicate the disease. The disease claimed more than 46,000 lives in 2013. While the disease is easily preventable, curable and treatable, it remains a big health threat to many communities in Kenya [3, 25].

The ailments have proved to be serious threats to the economy. Nearly all Kenyan households experience the burden caused by malarial illness [24, 25] . The economic effects of malaria infection can be tremendous and include direct costs for treatment and prevention, as well as indirect costs such as lost productivity from morbidity and mortality; time spent seeking treatment, and diversion of household resources. All these affect the country economy, leading to increased poverty [4, 11].

The Kenya government, through the Ministry of Health (MoH) is committed to the control and prevention of Malaria and subsequently developed a strategy document titled "President's Malaria Initiative Kenya - Malaria Operation Plan FY 2013."The National Malaria Strategy National Malaria Strategy (NMS) document outlined several intervention measures which includes: management of malarial illness, vector control by use of Insecticide-Treated Mosquito Nets (ITNs) and other methods, such as indoor spraying;

control of malaria in pregnancy; and epidemic prevention and control. Although progress has been made and Malaria has been on a slow but steady decline [4, 11], one of the gaps identified in the NMS is insufficient advocacy and social mobilization which can be enhanced through Behavior Change Communication (BCC) strategy.

While the MoH through National Malaria Control Programme (NMCP) would like to design interventions to prevent and control malaria among households in Kabras division Kakamega County, they have inadequate understanding of the factors that can influence community behaviors to adopt malaria prevention and control practices in the community. Kabras division in Kakamega County is experiencing high all-year-round malaria transmission with high prevalence in the month of April to September [10]. This community has been selected as a potential test bed to explore how to tackle malaria through BCC in local communities in Kakamega County and the country as a whole.

This study therefore investigated a local community's KAP on malaria. The KAP investigated the community's understanding of malaria transmission, their recognition of signs and symptoms, their treatment- seeking behaviors, community preventive measures and practices such as bed net use and clearing of bushes around households, as well as the cultural contest within which all of this occurs. The study intendeds to provide baseline information that would inform the design of malaria prevention and control interventions in the region.

1.2 STATEMENT OF THE PROBLEM

Malaria is the most diagnosed condition in outpatients at health facilities in Kabras North Division. Patient statistics at one of the main health centre (Shivanga) that serve the community confirm the high prevalence of malaria in the area. Kenya Health Information Systems (KHIS) data about malaria in Kabras North, for the period June 2014 to September 2014, shows that of the 6519 Out Patient Department (OPD) cases (Both age < 5 years and > 5 years), Malaria was responsible for 3148 cases (48.3%). This study investigated

the understanding of households in Kabras North Division on malaria transmission, their recognition of signs and symptoms, and their treatment seeking behaviours, household preventive measures and practices as well as the cultural context within which all of this occurs. This knowledge coupled with an understanding of community's social cultural attributes as well as demographics facilitated MoH-NMCP to design more effective BCC strategy towards malaria prevention and control in the region.

1.3 OBJECTIVE OF THE STUDY

To investigate Kabras community's knowledge, attitudes and practices in relation to malaria prevention and control and use the information obtained to design more effective strategic BCC interventions.

1.4 SPECIFIC OBJECTIVES

The specific objectives are to;

i. Describe the social-demographic characteristics of the community.

ii. Assess the knowledge and attitude of community about malaria transmission, prevention and control

iii. Assess the treatment seeking behavior of the local community for malaria like illness

iv. Identify relationships between knowledge, attitudes and practices, socio-economic and demographic variables in relation to malaria prevention and control

1.5 SIGNIFICANCE OF THE STUDY

This study adds to the growing body of knowledge needed for malaria programming for Kakamega County and the MoH NMCP by providing strategic information to compliment

facility-based malaria data sources. The survey provided community data on key malaria indicators including mosquito net ownership and use. To effectively mobilize the community, we need to know what information they have about malaria and their attitudes and practices towards malaria in order to tailor messages that suit their needs. In particular, findings from this study will enable NMCP design more effective BCC strategies.

1.6 BASIC CONCEPTS

There are a number of operational definitions that frame and helped guide this research. These include:

- **Knowledge of malaria:** The ability of a person to have correct understanding of malaria in terms of causative agent, mode of transmission, signs and symptoms, treatment and prevention.

- **Attitudes towards malaria prevention:** Beliefs of susceptibility, seriousness and threat of malaria.

- **Practice of malaria prevention:** Routine activities and actions of individual or group for prevention of malaria. These include the use of insecticide treated mosquito nets, using insecticides to spray and control/clear mosquito breeding places.

- **Community** refers to a group of people living in a particular area and having shared values, cultural patterns, and social problems.

- **Malaria management** refers to the whole process of recognition of the causes, symptoms and transmission of malaria and seeking health care for it treatment promptly.

- **Malaria control** is the process that requires eradicating the carrier mosquito or reducing man-vector contact so as to cut in the life-cycle of the parasite.

- **Prevalence of malaria disease** means the proportion of individuals in a defined population that have malaria during a specified period of time (period prevalence).

- **Household head** is an adult who is$>$ 18 years and in charge of the others in the household.

Chapter 2

LITERATURE REVIEW

2.1 EPIDEMIOLOGY OF MALARIA IN KENYA

Malaria transmission and infection risk in Kenya is determined largely by altitude, rainfall patterns and temperature [14, 6, 21], and therefore varies considerably across the country and by season [13, 14]. There are two rainy seasons-the long rains occur from April to June and the short rains from October to December [2]. The temperature remains high throughout these months. The hottest period is from February to March and the coldest from July to August. Malaria is caused by the Plasmodium parasite, with Pasmodium *falciparum* type causing the most severe form of the disease and accounting for 98% of all Malara infections. The parasite is spread to humans through the bites by carrier mosquitoes. The major malaria vectors are members of the *Anopheles gambiae complex* and *Anopheles funestus* [18, 21].

About 70% of the population of Kenya is at risk of malaria [21, 20]. The majority of this at-risk population (28 million) lives in areas of low or unstable transmission where *P. falciparum* parasite prevalence is less than 5%. Although the entire population is at risk of malaria, the most vulnerable group to malaria infections include pregnant women, children under 5 years of age and people living with Human Immunodeficiency Virus (HIV) Acquired Immune-Defficiency Syndrome (AIDS).

For purposes of malaria control, the country has been stratified into four epidemiological zones [21, 6, 20].

2.1.1 ENDEMIC AREAS

These are areas of stable malaria. They include areas around Lake Victoria in Western Kenya and in Coastal regions of the country with altitudes ranging from 0 to 1300 meters. Of the total Kenyan population, 29% lives in a malaria endemic zone. Malaria prevalence is between 20-40% [21, 6].

2.1.2 HIGHLAND ENDEMIC-PRONE AREAS

Malaria transmission in the western highlands is seasonal with considerable year-to-year variation. The entire population is vulnerable and case fatality during an epidemic can be up to ten times greater than in endemic regions. Approximately 20% of Kenyans live in these areas; their malaria prevalence ranges from 1% to 5% but with some areas experiencing prevalence between 10% and 20% [21, 6].

2.1.3 SEASONAL MALARIA TRANSMISSION AREAS

This epidemiological zone comprises arid and semi-arid areas of northern and southern parts of the country which experience short periods of intense malaria transmission during the rainy seasons. Approximately 21% of the Kenyan population lives within these arid/semi-arid areas of the country; the malaria prevalence is less than 5% [21, 6].

2.1.4 LOW MALARIA RISK AREAS

This zone covers the central highlands of Kenya including Nairobi. Approximately 30% of Kenyans live in these areas where there is little to no disease transmission [21, 6].

2.2 THE ROLE OF HUMAN FACTORS IN THE SPREAD OF MALARIA IN KENYA

2.2.1 SOCIO-ECONOMIC STATUS

Higher socio-economic status is associated with a number of factors that lead to reduced malaria transmission from piped water and better refuse collection to better education, higher exposure to TV and radio prevention campaigns, and increased ability to afford prevention methods and treatment [15]. These factors contribute to a better awareness of vector breeding sites, malaria transmission, and control among people of higher socio-economic status [5].

2.2.2 HOUSEHOLD FACTORS

Better-quality housing decreases the risk of malaria as it minimizes entry points for mosquitoes during the night. To illustrate this, a study in Gambia showed that houses with malaria-infected children are more likely to have mud walls, open eaves, and absent ceilings than those with uninfected children [1].

2.2.3 COMMUNITY FACTORS

Hygiene, sanitation, and waste collection are key determinants of malaria transmission, while household responsibilities, have a community-level effect on disease transmission. As an example, the more the households dispose of waste, the lower the risk of liquid waste collecting in pools of stagnant water and forming vector breeding sites [16].

2.3 PREVENTION AND CONTROL STRATEGIES

In 2002, a national malaria-control strategy was initiated, which followed a four-pronged approach including prompt and effective treatment, prevention and management of malaria in pregnancy, use of ITNs, and epidemic preparedness and response. Interventions to address malaria are being implemented in 16 districts. These four interventions are Integrated Management of Childhood Illness (IMCI), Intermittent Preventive Treatment (IPT) for pregnant women, targeted ITNs, and Indoor Residual Spraying (IRS) for vector control.

The Government of Kenya (GoK) remains committed to improved health service delivery and places a high priority on malaria control [22, 23]. However malaria remains the leading cause of morbidity and mortality in Kenya. Clinically diagnosed malaria is responsible for 30% of outpatient consultations, while 15% of hospital admissions and 3-5% of inpatient deaths are attributed to malaria. In 2007, there were 9.6 million reported clinically diagnosed malaria cases in the public health sector.

In a continued effort to fight malaria and address malaria morbidity and mortality burden, the Government of Kenya, through the Ministry of Health, has prioritized malaria prevention and treatment interventions as outlined in the 2009-2017 NMS. The objectives of the National Malaria Strategy 2009-2017 are: by 2013, to have at least 80% of people living in malaria risk areas using appropriate malaria preventive interventions; to have 100% of fever cases which present to a health worker receive prompt and effective diagnosis and treatment by 2013; to ensure that all malaria epidemic-prone districts (now subcounties) have the capacity to detect and the ability to respond to malaria epidemics annually; to strengthen surveillance, monitoring and evaluation systems so that key malaria indicators are routinely monitored and evaluated in all-risk malaria districts(now subcounties) by 2011; to strengthen advocacy, communication and social mobilization capacities for malaria control to ensure at least 80% of people in areas at risk of malaria

have knowledge on prevention and treatment of malaria by 2014 [23]. However, designing effective BCC interventions in specific communities can only be done after good operational research has been conducted to inform the design.

2.4 COMMUNITY KAP STUDIES ON MALARIA

A household survey undertaken in northern Swaziland showed that a substantial number of research participants had reasonable knowledge of malaria, including correct association between malaria and mosquito bites. Almost 90% (n=320) of the respondents stated that they would seek treatment within 24 hours of onset of malaria symptoms, with health facilities as their first treatment option. Most people (78%) perceived clinics and vector control practices as critical to treating and preventing malaria disease. IRS coverage and bed net ownership were 87.2% and 38.8%, respectively [7].

According to an exploratory study of malaria prevalence and people's knowledge, attitudes and practices of mosquito larval source management for malaria control in western Kenya, malaria prevalence was moderate (3.2-6.5) in all sites [8]. All the same, residents perceived malaria as their major health risk. Thirty two percent (29/90) of all respondents did not know that mosquitoes are responsible for transmission of malaria. Above one-third (26/67) believed that immature mosquitoes develop in vegetation and rarely mentioned man-made pools, drainage channels and burrow pits and therefore showing poor knowledge of habitat characteristics [8, 9].

Findings of a cross-sectional survey in Mukono District, Uganda involving 5583 households [12], revealed superficial use of ITNs for malaria prevention with only 546 households (9.8%) owning and using ITNs. Similarly, only a few households (86, 1.5%) used indoor residual spraying. Self-treatment with home stocked drugs was high yet there was low awareness of the effectiveness of expired drugs on malaria treatment. Self-reported malaria was associated with socio-economic, behavioral and environmental factors, but more especially with household ownership of ITNs [12].

A community survey of 388 mothers in a rural and peri-urban population surrounding a district hospital on the coast of Kenya [19], revealed that the preferred choice of treatment for childhood illness was with propriety drugs bought over the counter at shops and kiosks (72% of interviews). 67% of the mothers who reported using shops claimed they would buy chloroquine - based drugs. Preventative measures such as mosquito nets were uncommon (6.2%), but the use of commercial pyrethrum mosquito coils was reported more frequently (46.4%). Separate investigations of treatment given to 394 children before presentation at hospital with severe and mild was consistent with the reports in the community of high usage of shop-bought malaria and anti-pyretic.

By a study in Kilifi district (now sub-county) on the Kenyan coast in order to examine child malaria treatment practices, childhood malaria was perceived as mild, everyday illness, not preventable but treatable. The link between malaria and mosquitoes was not recognized. Mothers recognized convulsions, anemia and splenomegaly but did not link them to malaria [17].

2.5 SUMMARY OF LITERATURE REVIEW

A number of studies have been conducted in Kenya regarding the community knowledge, about malaria and how to combat it. However, malaria continues to be one of the major public health problems throughout the country; it imposes its negative consequences especially on the poor society living under low socio-economic conditions. This is suggestive of further need to focus on the local awareness and practice type of studies since the political, cultural, socio -economic conditions and access to health services might differ among communities and households.

The level of community knowledge and belief about seriousness of the disease could implicate the observed morbidity and mortality in the Kabras community. The understanding of the possible causes, modes of transmission, and individuals' preference and

decision about adoption of preventive and control measures vary from community to community and among individual households [24].

The main aim of the study is to determine the current situation on the KAP of the local community in Kabras North Division, Kakamega County about malaria transmission and its control measures.

Chapter 3

RESEARCH METHODOLOGY

3.1 STUDY DESIGN

The research is basically a community based descriptive cross-sectional survey.

3.2 STUDY AREA

The study was conducted among residents of Kabras North Division which is located 42 Kilometres North of Kakamega Town, in Kakamega County, Western Kenya. The Division has a total area of 113.4 square kilometers. According to available data, the total population of Kabras North is about 51,856 with approximately 10,022 households. Kabras North Division was selected as study site because it is one of the areas in Kakamega County where malaria prevalence is still high and therefore a possible location for interventions [10].

3.3 STUDY POPULATION

The study targeted heads of households/adults living in selected Sub locations (villages) in Kabras North Division, Kakamega County.

3.4 INCLUSION CRITERIA AND EXCLUSION CRITERIA

3.4.1 INCLUSION CRITERIA

The participant should be a permanent member in a community, adult (above 18 years old, head of house hold) to be selected for interview.

3.4.2 EXCLUSION CRITERIA

Community members who were unable to communicate and mentally handicapped will be excluded.

3.5 SAMPLE SIZE AND SAMPLING PROCEDURES

The following formula as used by Lohr in 2010 was used to select a sample from the population of interest. For large population $>$ 10,000,

$$\text{Sample Size } (SS)_0 = \frac{Z^2 \times p \times (1-p)}{e^2} \tag{3.1}$$

where:

- Z = the confidence Level (= 1.96 for $\alpha = 0.05$)
- P = percentage of picking a choice, expressed as decimal (in this case 0.5)
- e = allowable error (5%). In this study we used the 0.05

Correction for finite population gives

$$\text{New SS} = \frac{(SS)_0}{1 + \frac{(SS)_0 - 1}{N}} \tag{3.2}$$

Where N= population size.

$$\text{Sample Size } (SS)_0 = \frac{1.96^2 \times 0.5 \times (1-0.5)}{0.05^2} = 384.16 \tag{3.3}$$

and

$$\text{New SS} = \frac{384.16}{1+\frac{384.16-1}{10022}} = 370.0137 \approx 370 \tag{3.4}$$

A total of 370 households were obtained.

The area of study was divided into three administrative locations. Their populations are summarized in Table 3.1. A stratified sampling approach was used to proportionately allocate the number of households to be sampled from each of the locations. Each location had at least three sub-locations. A sub-location was selected at random to represent the location. The allocated number of households were then sampled using Simple Random Sampling procedure.

Table 3.1: Proportionate allocation of sample sizes per location

Location	Sub-location selected at random	Population N_i	Proportion allocated $n_i = \frac{N_i}{N} \times 370$
Silungai	Manda	2,945	109
Chegulo	Namushiya	3,946	146
Shivanga	Fuvuye	3,131	115
Total		10,022	370

3.6 DATA COLLECTION AND MANAGEMENT

3.6.1 RESEARCH INSTRUMENTS/ QUESTIONNAIRE

A standardized structured questionnaire developed from earlier studies related to malaria was used. The questions sought to gain insight into a respondent's knowledge, attitudes and practices towards malaria. The questionnaire also covered demographic characteristics of respondents.

The questionnaire had a total of 56 questions divided into seven areas that include:

1. Demographics - has 11 questions that covered a wide range of social demographic

areas.

2. Basic knowledge about malaria - has 8 questions that are related to different aspects of malaria. They range from sources of basic information, signs and symptoms, transmission as well as the prevention of malaria.

3. Bed net ownership and use has 4 questions.

4. Sources of information about malaria has 2 questions.

5. Treatment seeking behaviours - has 7 questions covering basic sources of treatment information as well s different treatment options.

6. Attitudes towards malaria - comprised of a combination of 15 positive and negative statements that used a likert scale to measure the attitude of respondents towards different aspects of malaria

7. Malaria prevention practices - which has a combination of 9 positive and negative statements that used a Likert scale to gauge respondent's malaria prevention and control practices.

3.6.2 DATA COLLECTION PROCESS

The study was conducted using a structured questionnaire and a pen. The interviewer visited selected homesteads and presented the questionnaire to the respondent. Those who were not able to read were assisted.

The questionnaire was pre-tested among 5% of the sample of the nearby inhabitants and the necessary correction and structuring of the questionnaire made. The actual data was collected between 8th and 22nd October 2014 using 370 questionnaires. A data entry sheet was designed in Statistical Package for Social Sciences (SPSS). Data from questionnaire was thereafter converted into electronic data for analysis.

3.7 DATA PROCESSING AND ANALYSIS

3.7.1 EXPLORATORY DATA ANALYSIS

Frequency and contingency tables were used to describe the data. This was a necessary process to check for data completeness and availability of extreme (outlier) values. Outliers values were not recorded since most of the questions were close ended.

The frequency tables tackled the first objective for this study, that is, to "describe the social-demographic characteristics of the community."The counts and valid percents were the main columns used. In addition, bar graphs were used to describe select portions of demographics.

Frequency tables were again used to assess the knowledge and attitude of community about malaria transmission, prevention and control, and to assess the treatment seeking behavior of the local community for malaria like illness.

3.7.2 CONFIRMATORY DATA ANALYSIS

Confirmatory tests were used to identify relationships between knowledge, attitudes and practices, socio-economic and demographic variables in relation to malaria prevention and control. The Pearson Chi-square tests for association was used. In this study, we expected the knowledge about malaria amongst respondents to be associated with their practices related to prevention and control. The chi-square test tested the null hypothesis that there is no statistically significant difference between expected and observed results. The null hypothesis is rejected in case the p-value was less than 0.05. In addition, the Cramer's V statistic was used to test for the strength of association between variables.

Contingency tables were used to display the observed and expected counts when comparing two categorical variables. The expected value was calculated as

$$\text{Expected Value} = \frac{\text{observed row total} \times \text{observed column total}}{\text{sample size}} \tag{3.5}$$

Chi-square test assumes that each cell should have at least a count of **five** for a 2×2 contingency table, and that all cells should have expected frequencies that are greater than **one** in case the table's dimensions are more than 2×2. In addition, a minimum 80% of the cells should have expected frequencies of 5 and above.

The degree of freedom is calculated as:

$$[\text{Number of rows} - 1] \times [\text{Number of columns} - 1] \tag{3.6}$$

Chapter 4

RESULTS

4.1 INTRODUCTION

The results and discussions of this study have been divided into four sections, the social-demographic characteristics of the community, the relationships between knowledge, attitudes and practices, socio-economic and demographic variables in relation to malaria prevention and control, the treatment seeking behaviour of the local community for malaria like illness and finally the knowledge and attitude of community about malaria transmission, prevention and control.

4.2 SOCIAL-DEMOGRAPHIC CHARACTERISTICS OF THE COMMUNITY

The sample size was 370 as calculated under section 3.5. Table 4.1 below summarizes the socio-demographic characteristics of the community. majority of the respondents were male 75.4%. Most respondents were either 31-40 years (44.9%) age category or 21-30 years (18.9%) while the least were aged 51-60 years (0.5%). Almost two-thirds (63.3%) of the household heads had primary education only while 36.8% proceeded to secondary. For people living in the household, 41.6% indicated four or five while the least 1.9% said

two.

Table 4.1: Distribution of gender, age and education among respondents

Characteristic	Labels	Count	Percentage (%)
Gender (n=370)	Male	278	75.4
	Female	92	24.6
Age (n=370)	21-30 years	70	18.9
	31-40 years	166	44.9
	41-50 years	69	18.6
	51-60 years	2	0.5
	Above 60 years	63	17.0
Education (n=370)	Primary School (1-4)	18	4.9
	Primary School (5-8)	216	58.4
	Secondary	136	36.8

In order to get the highest education of education achieved by the respondents, the catgories included “No formal Education”and “College/ Tertiary Education”. None of the respondents affirmed to the two categories.

On the occupation of the respondents, most of them 33.8% are farmers while a few 2.7% are Government employees. Most of them 72.2% did not earn and 4 earned between 5,000 and 10,000, Table 4.2. Almost all the respondents (97.8%) lived in mud and clay houses, 2.2% lived in cemented block houses. Most respondents 92.7% have mabati while 7.3% grass on their roofs. 64.9% own electronic equipment and most people 45.4% own a radio while few 9.5% own a television , table 4.3.

Table 4.2: Socio-Economic characteristics for the respondents

Characteristic	Labels	Count	Percentage (%)
Household size (n=370)	Two	7	1.9
	Three	76	20.5
	Four or Five	154	41.6
	Six or more	133	36
Occupation (n=370)	Government Employee	10	2.7
	Private Employee	64	17.3
	Farmer	125	33.8
	Daily laborer	61	16.5
	Unemployed	110	29.7
Income (n=370)	50,00-10,000	4	1.1
	11,000 - 20,000	31	8.4
	21,000 - 30,000	57	15.4
	31,000 - 40,000	11	3.0
	None	267	72.2

The mean salary was Kenyan Shillings (KES) 6,230 per month and translates to KES 208 per day. The amount is approximately two dollars a day. The United Nations poverty line is a wage below USD 1.90 per day. The Kenya National Bureau of Statistics (KNBS) classifies Kakamega to have an average poverty incidence of 49.2. This means that almost half of the people in Kakamega are below the poverty line. The above statement shows the converse because of the few extreme cases who had a better salary. The median wage was KES 83 confirms the KNBS analysis. 72% of the respondents live below the poverty line.

Table 4.3: Characteristics of respondents houses

Characteristic	Labels	Count	Percentage (%)
House (n=370)	Mud and clay	362	97.8
	Cement block	8	2.2
Roof (n=370)	Mabati	343	92.7
	Grass	27	7.3
Electronic Equipment (n=370)	Yes	240	64.9
	No	130	35.1
Kind of Electonic Equipment (n=370)	Radio	168	45.4
	TV	35	9.5
	Newspaper	37	10
	None	130	35.1

4.3 RESPONDENTS' KNOWLEDGE ON MALARIA

From the responses above, all interviewed households were aware of Malaria as a disease and the vector that transmit it, that is mosquitoes. Almost all are aware that Malaria mosquitoes bite both day and night. The respondents felt they still needed additional information on Malaria, in particular prevention. they added that their preferred radio as the channel through which such information was communicated, as shown in the following section.

4.3.1 EXISTENCE OF MALARIA

All respondents had received information on malaria. Most of them (57.6%) got the information through radio, 20% from neighbour, 9.7% from drug shop, 8.1% through television, 4.3% from a community health workers and 0.3% through a family member. All respondents knew mosquito to be the vector through which malaria is transmitted. Only one (0.3%) of the 370 respondents mentioned that malaria is transmitted to humans through drinking contaminated water. Furthermore, only two respondents (.5%) disagreed that malaria can kill if not treated. The remaining 99.5% said malaria can kill if not treated.

Almost all respondents (99.7%) said malaria mosquitoes bite both day and night.

Most respondents (90%) admitted that they do not have enough information about malaria. The remaining 10% said they do. Almost half of the respondents (41.1%) said they would require more information on prevention of malaria, 34.9% on control, 8.6% on nature of disease, 8.1% on symptoms and 7.3% on treatment.

The respondents suggested their preferred medium for receiving communication about malaria control and treatment. More than half of them (57.6%) preferred radio, 15.7 % the pharmacy, 14.9% by a community health worker, 8.4% from a health center, 3.0% by a village health team and 0.5% by the neighbour.

4.3.2 MALARIA SYMPTOMS

Table 4.4: Respondents knowlegde on Malaria symptoms

Malaria Symptoms	Frequency	Percent (%)
High temperature	101	27.3
Loss of energy	107	28.9
Vomiting	22	5.9
Sweating	110	29.7
Headache	30	8.1

Table 4.4 gives the respondents' knowledge on Malaria Symptoms. Most respondents (29.7%) mentioned sweating was a symptom 28.9% indicated loss of energy, 27.3% high temperature, 8.1% headache and 5.9% said vomiting.

Of the known symptoms in Kabras North, the residents would suspect Malaria when the patient has high temperature, sweat or had loss of energy. They would rarely suspect Malaria if the patient vomited or had headache.

4.3.3 MALARIA PREVENTION AND CONTROL

Majority of the respondents 53.5% indicated spraying insecticide, 20.8% said making fire and smoke, 14.3% sleeping in bed nets, 7.6% cleaning dark corners in the house, 3.2% wearing long sleeved clothes and 0.3% said trimming of bushes around the house as shown in table 4.5.

Table 4.5: Respondents knowledge on Malaria prevention and control

Prevention and control measures	Frequency	Percent (%)
Sleeping in bed nets	53	14.3
Wearing long sleeved clothes	12	3.2
Making fire and smoke	77	20.8
Spraying insecticide	198	53.5
Trimming of bushes around the house	1	0.3
Cleaning dark corners in the house	28	7.6
None	1	0.3

Of the prevention and control strategies, the respondents preferred methods that target the vector directly like sleeping under mosquito nets, making fire and smoke, and spraying insecticides.

4.4 PERSONAL MALARIA PREVENTION AND CONTROL MEASURES

The study sought to uncover the protection measures to guard the family against malaria. Majority 40.8% indicated using mosquito nets, 17.8% burnt cow dung and leaves, 15.1% closed windows and doors, 8.9% sprayed insecticides (doom) and 6.8% used repellents. The table 4.6 shows that more than half of the respondents preferred other methods for controlling mosquito bites. This was partially due to personality types of many respondents. Some stated that they would feel as though they were suffocating when they sleep under a mosquito net (Table 4.6).

Table 4.6: Personal Malaria prevention and control measures

Personal protection measures against malaria	Frequency	Percent (%)
Use repellents	25	6.8
Use mosquito coil	40	10.8
Use doom	33	8.9
Burn cow dung/leaves	65	17.6
Close windows and doors	56	15.1
Use mosquito nets	151	40.8
Total	370	100.0

When asked if they had bed nets in their households, majority of the respondents (52.4%) said yes while (47.8%) said No (Figure 4.1).

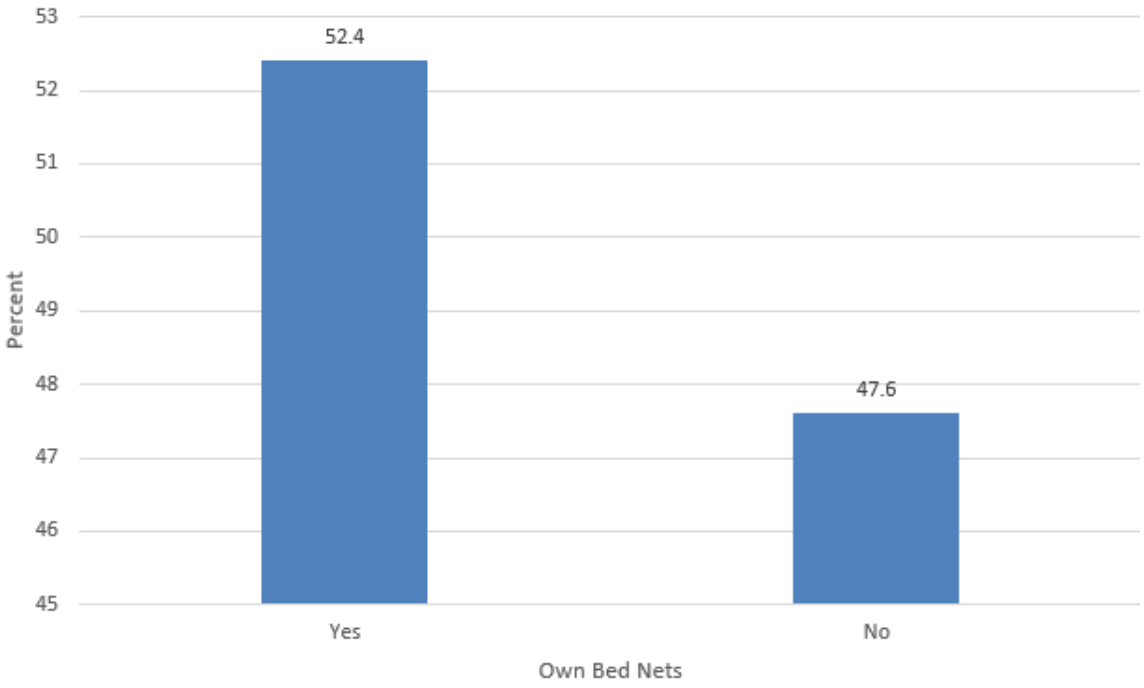

Figure 4.1: Proportion of respondents owning bed nets

The nets were used by mothers in most of the households (48.9%). In decreasing proportions, the bed nets were used by children under five years (47.9%), those aged more than five years (3%) and fathers (0.3%).

4.4.1 TREATMENT SEEKING BEHAVIOUR

Almost all households (99.7%) sampled had a member who suffered from malaria in the last six months. All respondents said that they take drugs immediately the symptoms show up. Thereafter, most respondents (67.6%) seek treatment from a community health workers when symptoms of malaria are present, 16.2% said they would go to a health center and 15.9% visit a pharmacist. A few respondents (0.3%) did not give any answer in their treatment seeking behaviour. Upon further prompting, some of the respondents believed that Malaria is a disease that heals by itself. This may explain the very low proportion that visit the pharmacy upon suspected incidence of Malaria (15.9%). Other respondents added that people in their region share medicine while some stop medication as soon as they feel better, leading to incomplete dozes.

4.5 ATTITUDES TOWARDS MALARIA

The respondent's attitudes towards malaria has been summarised in Table 4.7. The first column gives the question asked. The third to seventh columns give frequencies and percent across responses to that question.

The following paragraphs present detailed responses to the individual questions on attitude towards malaria. In the table, SD means Strongly Disagree, D is Disagree, A is Agree, SA is Strongly Agree and N is None. None constituted the respondents who did not respond to the question.

Table 4.7: Summary of respondents Attitudes towards malaria

Attitude		**SD**	**D**	**N**	**A**	**SA**
I think malaria is a serious and life threatening disease	N	0	0	24	344	2
	%	0.0	0.0	6.5	93.0	0.5
Malaria can be transmitted from one person to another like common cold	N	344	26	0	0	0
	%	93.0	7.0	0.0	0.0	0.0
I think the best way to prevent myself getting malaria is to avoid getting mosquito bites	N	344	0	0	2	0
	%	93.0	0.0	0.0	0.5	0.0
I am sure that anyone can get malaria	N	0	0	0	346	24
	%	0.0	0.0	0.0	93.5	6.5
I believe sleeping under mosquito net is one way to prevent myself getting malaria	N	4	0	0	25	341
	%	1.1	0.0	0.0	6.8	92.2
I am sure I can treat myself when I get malaria	N	340	28	0	2	0
	%	91.9	7.6	0.0	0.5	0.0
In my opinion, only children and pregnant women are at risk of malaria	N	25	341	0	4	0
	%	6.8	92.2	0.0	1.1	0.0
I think one can recover spontaneously from malaria without any treatment	N	345	25	0	0	0
	%	93.2	6.8	0.0	0.0	0.0

Attitude		SD	D	N	A	SA
If someone has got malaria, people should avoid having close contact with him/her	N	24	346	0	0	0
	%	6.5	93.5	0.0	0.0	0.0
I might be at greater risk of getting malaria if I work and sleep overnight in the garden or forest	N	0	0	0	25	345
	%	0.0	0.0	0.0	6.8	93.2
I think that is dangerous when malaria medicine is not taken completely	N	0	0	0	346	24
	%	0.0	0.0	0.0	93.5	6.5
I can buy anti-malaria drugs from the shop/pharmacy to treat myself when i get malaria	N	0	0	25	335	10
	%	0.0	0.0	6.8	90.5	2.5
I think that I should go to the health centre to have my blood tested as soon as I suspect that I have suffered from malaria	N	0	0	0	63	307
	%	0.0	0.0	0.0	17.0	83.0
I will seek for advic or treatment when i get malaria	N	0	0	0	311	59
	%	0.0	0.0	0.0	84.0	16.0
Attitude		**SD**	**D**	**N**	**A**	**SA**
In my opinion, it is very important to check for an expiry date of the drug before taking it	N	10	0	24	29	307
	%	2.7	0.0	6.5	7.8	83.0

When asked if malaria is a serious and life threatening disease, majority 93% agreed while 6.5% did not respond and 0.5% strongly agreed. Majority of the respondents generally disagreed that malaria can be transmitted from one person to another like common cold; 93% strongly disagreed while 7.0% disagreed. The respondents also disagreed that malaria can be prevented by avoiding mosquito bites; 93% strongly disagreed, 6.5% did not respond and 0.5% agreed.

Most respondents agreed that anyone can get malaria with 93.5% just agreeing and 6.5% agreeing strongly. In addition, they agreed that sleeping under mosquito net is one way to prevent malaria. Almost all 92.2% strongly agreed and 6.8% agreed while 1.1% disagreed strongly.

On the contrary, most respondents (91.9%) strongly disagreed that they can treat themselves when they get malaria, 7.6% disagreed and 0.5% agreed. In addition, 92.2% disagreed, 6.8% strongly disagreed and 1.1% agreed that only children and pregnant women

are at risk of malaria.

Majority of the respondents (93.2%) strongly disagreed and 6.8% disagreed that one can recover spontaneously from malaria without any treatment.

Most respondents (93.5%) disagreed and 6.5% strongly disagreed that when someone has malaria, people should avoid having close contact with him/her.

The respondents also agreed that one is at greater risk of getting malaria if they work and sleep overnight in the garden or forest; 93.2% strongly agreed and 6.8% agreed.

The respondents also agreed that it is dangerous not to complete the malaria dose; 93.5% agreed and 6.5% strongly agreed. Of the respondents, 90.5% agreed and 2.5% strongly agreed that they can buy anti-malaria drugs from the shop/pharmacy to treat themselves. They also agreed that they should go to the health centre/clinic to have their blood tested as soon as they suspect that they have suffered from malaria, with 83.0% strongly agreeing and 17% agreeing. They also said that they will seek for advice or treatment when they get malaria with 84% of the respondents agreeing and 16% agreeing strongly.

The respondents also agreed that it is very important to check for an expiry date of the drug before taking it;83% strongly agreed, 7.8% agreed and 2.7% strongly disagreed, see Table 4.7.

4.6 PRACTICES TOWARDS MALARIA PREVENTION

To figure out the general practices towards Malaria prevention, a set of statements were presented to respondents and they would score using a likert scale. The scale had three categories; Always, Sometimes, Never. The statements were not mandatory. Their responses are summarized using frequencies and percent of respondents in Table 4.8.

The first statement asked was “How often do you sleep in treated mosquito nets? ”. The Table 4.8 shows that 171 (46.2%) of the respondents always slept under treated mosquito nets, while 175 (47.3%) of the them never slept under treated mosquito nets. A further 24

(6.5%) of the respondents felt this statement did not feature for them hence they skipped it.

Table 4.8: Practices towards malaria prevention

Practices		**Always**	**Sometimes**	**Never**	**None**
How often do you sleep in	N	171	0	175	24
treated mosquito net	%	46.2	0	47.3	6.5
How often do other members	N	134	0	200	36
of the house hold sleep	%	36.2	0	54.1	9.7
in mosquito nets					
How often do you check for	N	104	67	177	22
holes/repair mosquito nets	%	28.1	18.1	47.8	5.9
How often do you use mosquito	N	99	11	226	34
repellent coils on your house	%	26.8	3.0	61.1	9.2
How often do you clean/cut	N	346	0	0	24
bushes around your house	%	93.5	0	0	6.5
How often do you clean	N	346	24	0	0
stagnant water near your house	%	93.5	6.5	0	0
How often do you visit	N	346	24	0	0
health centre when you fall sick	%	93.5	6.5	0	0
How often do you use anti-	N	228	59	59	24
mosquito spray in your house	%	61.6	15.9	15.9	6.5
How often do you receive visits	N	344	0	0	26
from the village health team	%	93.0	0	0	7

The most common Malaria prevention strategies was clearing bushes around the house. Nine out of ten households admitted to always clearing the bushes around the house. The respondents also mentioned that they always welcome visiting village health teams in a bid to control Malaria (Table 4.8) and apart from that they would opt to cure Malaria.

This study considered the frequency of sleeping under mosquito nets given the age bracket of the household head. This was conducted using a contingency table (Table 4.9) and eventual chi-square test (Table 4.10). In Table 4.9, there is very little deviation by the expected values from the observed values. The households whose heads were aged 41-50 years experienced the most (13) deviation of the expected from observed for the two categories of Always and Never sleeping under a mosquito net.

Table 4.9: Contingency table btween age and the frequency a respondent sleeps under a mosquito net

Age bracket		How often do you sleep in treated mosquito net		
		Always	Never	Total R
15-20 years	Observed	15	24	39
	Exected	17	22	
21-30 years	Observed	74	50	124
	Expected	53	71	
31-40 years	Observed	3	0	3
	Expected	1	2	
41-50 years	Observed	66	120	186
	Expected	79	107	
51-60 years	Observed	0	18	18
	Expected	8	10	
Total	Observed	158	212	370
	Expected	158	212	

The Chi-Square tested the hypothesis:

- H_0: There is no association between age of household head and the frequency of sleeping under mosquito net
- H_1: There is an association between age of household head and the frequency of sleeping under mosquito net

This study used both the manual method of calculating the Chi-square statistic and then used the SPSS to calculate the same statistic in order to test the hypothesis above.

The empirical method for calculating the chi-square statistic (χ^2_{calc}) is given in equation 4.1. The test statistic was calculated to be 38.58. The tabulated statistic for the $\chi^2_{005,4} = 9.488$. Since $\chi^2_{calc} > \chi^2_{tab}$, we reject H_0 at the $\alpha = 0.05$ level.

$$\chi^2_{calc} = \sum_{i=1}^{k} \frac{(O_i - E_i)^2}{E_i}, \tag{4.1}$$

where k = No. of cells in contingency table.

$$= \frac{(-2)^2}{17} + \frac{(2)^2}{22} + \frac{(21)^2}{53} + \cdots + \frac{(8)^2}{10}$$

$$= 38.58$$

$$\chi^2_{tab} = \chi^2_{005,4} = 9.488$$

The computer generated test statistic was 36.291 (Table 4.10) which had statistical significance with a p value of less than 0.001. The slight deviation between manual and computer generated chi-square values is because the SPSS software automatically corrected for cell values with less than one observation.

Table 4.10: Hypothesis test for the cross tabulation in table 4.9.

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	36.291[a]	4	0.000
Likelihood Ratio	43.879	4	.000
Linear-by-Linear Association	16.443	1	0.000
Nominal by Nominal Phi	0.313		0.000
Nominal by Nominal Cramer's V	0.313		0.000
N of Valid Cases	370		

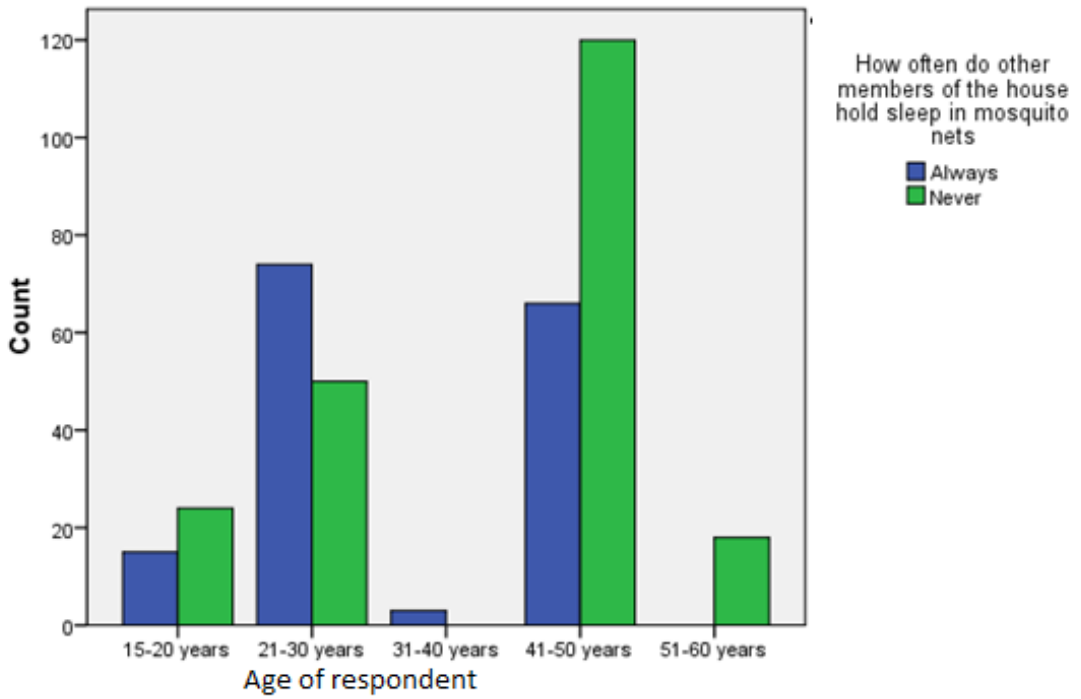

Figure 4.2: Age of respondent and number of those sleeping under Mosquito nets

Since the p-value is less than 0.001, we reject the null hypothesis at $\alpha = 0.001$ and state that there is strong evidence to indicate an association between age of household head and the frequency of sleeping under mosquito net. By looking at the tables 4.9 and 4.10, and figure 4.2, the older respondents tend to sleep less under mosquito nets.

A Pearson Chi-square test was used to test for association between household head's highest level of Education and the frequency a respondent sleeps under a mosquito net.

Table 4.11: Contingency table comparing expected and observed counts when between highest level of Education and the frequency a respondent sleeps under a mosquito net

Education level		How often do you sleep in treated mosquito net		
		Always	Never	Total
Primary (1-4)	Observed	0	18	18
	Expected	8	10	
Primary (5-8)	Observed	38	178	216
	Expected	92	124	
Secondary	Observed	120	16	136
	Expected	58	78	
Total	Observed	158	212	370
	Expected	158	212	

Table 4.12: Hypothesis test for the cross tabulation in Table 4.11

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	$1.843E2^a$	2	0.000
Likelihood Ratio	205.550	2	.000
Linear-by-Linear Association	169.729	1	0.000
Nominal by Nominal Phi	0.706		0.000
Nominal by Nominal Cramer's V	0.706		0.000
N of Valid Cases	370		

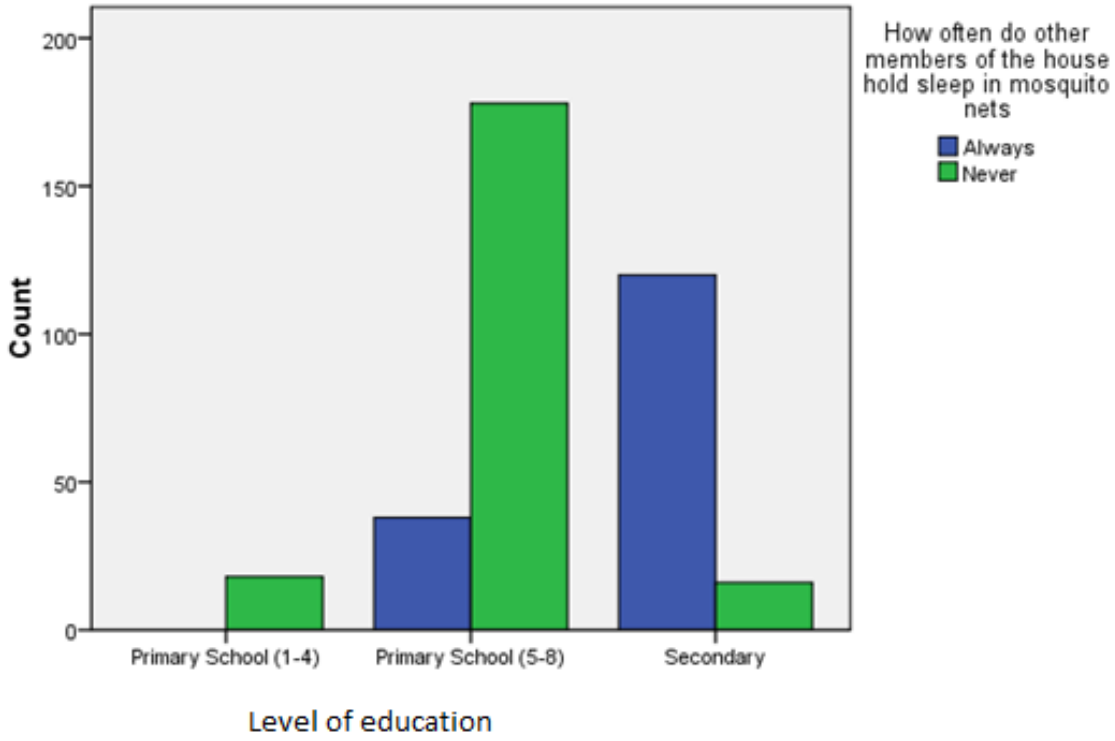

Figure 4.3: Respondents highest level of education

The hypothesis tested was:

- H_0: There is no association between household head's highest level of Education and the frequency of sleeping under mosquito net
- H_1: There is an association between household head's highest level of Education and the frequency of sleeping under mosquito net

A contingency table was first prepared (Table 4.11) and the test conducted using SPSS (Table 4.12)

Since the p-value is less than 0.001, we reject the null hypothesis at $\alpha = 0.001$ and state that there is strong evidence to indicate an association between household head's highest level of education and the frequency of sleeping under mosquito net. Tables 4.11 and Figure 4.2 show that households whose heads had higher education tend to sleep more often under mosquito nets.

4.7 RELATIONHSHIP BETWEEN KNOWLEDGE OF MALARIA AND TREATMENT SEEKING BEHAVIOUR

The attitude details were converted to knowledge. Since the Likert Score ranged between 1 and 4, four levels were used to assess the depth of knowledge of the respondents on Malaria. This was calculated as below:

Let the Knowledge level be Y, and the independent variables be either X_i if a response of **Strongly Agree** is the logically correct response on knowledge, and X_j is a response of **Strongly Disagree** is the logically correct response on knowledge. We can calculate the knowledge value of an individual respondent using the formula:

$$Y = \sum_{\text{all i}} X_i + \sum_{\text{all j}} (5 - X_j) \tag{4.2}$$

Where,

- KNOWLEVEL (Y) - Respondents Knowledge level on Malaria (a computed value for each respondent)
- THINK (X_i)- I think malaria is a serious and life threatening disease
- PERSON (X_j)- Malaria can be transmitted from one person to another like common cold
- BEST (X_i)- I think the best way to prevent myself getting malaria is to avoid getting mosquito bites cold
- SURE (X_i)- I am sure that anyone can get malaria
- SLEEPING (X_i)- I believe sleeping under mosquito net is one way to prevent myself getting malaria
- TREAT (X_j) - I am sure i can treat myself when i get malaria
- OPINION (X_j)- In my opinion, only children and pregnant women are at risk of malaria
- RECOVER (X_j) - I think one can recover spontaneously from malaria without any treatment
- GOT (X_j)- If someone has got malaria, people should avoid having close contact with him/her
- GREATER (X_i)- I might be at greater risk of getting malaria if i work and sleep overnight in the garden or forest
- MEDICINE (X_i) - I think that is dangerous when malaria medicine is not taken completely

- BUY (X_j) - I can buy anti-malaria drugs from the shop/pharmacy to treat myself when i get malaria
- FROM (X_i)- I think that i should go to the health centre/clinic to have my blood tested as soon as i suspect that i have suffered from malaria
- ADVIC (X_i) - I will seek for advice or treatment when i get malaria
- EXPIRY (X_i) - In my opinion, it is very important to check for an expiry date of the drug before taking it

The levels were then divided into four levels where

- Level 1 had values between 1 and 15
- Level 2 had values between 16 and 30
- Level 3 had values between 31 and 45
- Level 4 had values between 46 and 60

The categories were created so that a Chi-Square test could be conducted with other ordinal variables. The results are summarized in the following tables. Table 4.13 shows that all respondents had a minimum of level 3 understanding on Malaria as a disease and how to treat it.

Table 4.13: Respondents Knowledge level on Malaria classified into levels based on attitude

Level	Frequency	Percent
Level 3	98	26.5
Level 4	272	73.5

Table 4.14: Cross tabulation of Respondents Knowledge and treatment seeking habit

Place to seek treatment	Knowledge level		Total
	Level 3	Level 4	
Health center	98	0	98
Community health work	0	158	158
Pharmacy	0	114	114

All respondents, irrespective of their level of understanding Malaria, said that they would seek treatment for malaria within the first day after detecting the symptoms. They also felt that they did not have adequate information about Malaria treatment. However, those who scored level four would opt to self-prescribe malaria medication or contact a community health worker instead of seeking proper medical attention from the local health centre, see the Tables 4.14.

Despite having a good knowledge on Malaria, its symptoms and prevention, none of the respondents who had level 3 and another 114 (41.9%) of those with level 4 understanding of malaria owned mosquito nets, hence never slept under one. None of the respondents with level 3 knowledge on malaria ever used mosquito repellent coils while the bulk of those with level 4 (71.7%) always used them. Almost all the respondents (368/370) said that they always cleaned and cut bushes close to the house and drain any stagnant water.

Chapter 5

CONCLUSION AND RECOMMENDATIONS

5.1 INTRODUCTION

This chapter gives the summary, conclusions and recommendations of the study. It is divided into three parts, the first part gives the summary of the findings, the second part gives the conclusions of the study and the third part gives the recommendations that would improve malaria prevention.

5.2 SUMMARY

5.2.1 THE SOCIAL-DEMOGRAPHIC CHARACTERISTICS OF THE COMMUNITY

The study established that majority of the respondents were male aged between 31 and 40 years. Most of the household heads had studied to upper primary, and had household sizes of between four and five people. Many are farmers living in rural areas, without a regular source of income. They lived in mud and clay houses with *mabati* roof and were prone to frequent mosquito bites. Most respondents owned electronic equipment like radios which

they used to get information on malaria symptoms, prevention and treatment.

5.2.2 KNOWLEDGE AND ATTITUDE OF COMMUNITY ABOUT MALARIA TRANSMISSION, PREVENTION AND CONTROL

The study established that the respondents are well aware of malaria as a disease. They were aware that malaria is transmitted through mosquito bites and it can kill if not treated early. They understood that mosquitoes bite both day and night. They gave the common signs of malaria as sweating, loss of energy and high temperature. They said that sleeping in bed nets can reduce and control malaria, in addition to spraying insecticide. The respondents agreed that using mosquito nets can guard the family against malaria. They clarified that their children under five years and mothers sleep under bed nets. The main medium through which they got this information was the radio.

The study established that the attitude of respondents towards malaria are; they agreed that malaria is a serious and life threatening disease, that anyone can get malaria, sleeping under mosquito net one way of prevention from malaria, one cannot recover spontaneously from malaria without any treatment, one is at a greater risk of getting malaria if they work and sleep overnight in the garden or forest, it is dangerous when malaria medicine is not taken completely, they can buy anti-malaria drugs from the shop/pharmacy to treat themselves, agreed that it's important to have your blood tested if you suspect signs of malaria, one should seek for advice or treatment when they get malaria and it is very important to check for an expiry date of the drug before taking it.

5.2.3 TREATMENT SEEKING BEHAVIOUR OF THE LOCAL COMMUNITY FOR MALARIA LIKE ILLNESS

The respondents said that they would visit health centers to get treatment for Malaria. They also would self administer Malaraia tablets in case they did not visit the health facilities.

In addition, they mentioned that they would occasionally visit community health worker to learn more on the prevention and control of Malaria. Since most of them had radios, they preferred other relevant information be communicated through the popular local stations.

5.2.4 RELATIONSHIPS BETWEEN KNOWLEDGE, ATTITUDES AND PRACTICES, SOCIO-ECONOMIC AND DEMOGRAPHIC VARIABLES IN RELATION TO MALARIA PREVENTION AND CONTROL

Despite all respondents having a good grasp of malaria, its prevention and treatment, many are still not sleeping under bed nets. This study could not exhaustively establish as to why. Some proposed reasons are their economic status since many are poor and other pressing needs will have higher priorities than mosquito nets. Figure 4.1 showed that 47.6% do not own bed nets.

The respondents whose scores on understanding malaria were strong (level 4) did not seek medical attention from a health centre but opted to self-diagnose and self-treat themselves through the available pharmacies. Again this study could not exhaustively explain this behaviour. Other socio-economic factors could have played a role in this.

Finally, there was a clear relationship between age and prevention habits of sleeping under mosquito nets. The oder respondents tend to not sleep under mosquito nets while the younger respondents did. In addition, schooling affected the rate of respondents sleeping under the mosquito nets. A higher education level increased the chances for households to sleep under a mosquito net. Most respondents with secondary education owned mosquito nets (88.2%), unlike their counterparts with no secondary education (16.8%).

5.3 CONCLUSION

The study aimed at assessing community knowledge and practices in relation to malaria prevention and control to inform the design of more effective strategic/behaviour change communication (BCC) interventions. In general, most people had good knowledge about malaria prevention and control. Majority of respondents were aware of malaria, its transmission, common signs and recognized malaria as a threat to their lives in the community. Despite this (good knowledge and fair attitudes), practices towards malaria prevention and control were average. The respondents were at risk given their socio-economic characteristics. Many lived in mud houses, had dropped out of primary school and were not employed. Most would not buy the mosquito nets but managed nearby bushes and pools of water to control mosquito population. Interventions may be geared towards social and behaviour change to target increase in uptake of mosquito nets. The interventions should also consider empowerment of the Kabras rural folks to encourage them to seek proper testing and prescription use.

5.4 RECOMMENTATIONS

Based on the findings in the study, the following recommendations should be considered as an effort to improving preventive and control behaviour against malaria among the residents of Kabras:

Although knowledge about malaria prevention and control was generally good, it did not translate into good practice behaviour. Therefore public education is necessary to address the few but highly negative impact knowledge gaps highlighted in the study. For instance, some resident thought that there are people who can never fall sick from malaria such as children above 5 years and adults.

The residents were cognisant of risks associated with malaria. However, they were lax towards its prevention and control. This may be due to individual personalities and myths surrounding the disease and its preventive mechanisms. Some said they were afraid of

suffocating while sleeping under a mosquito bed net. Some believed that malaria usually heals automatically after a given period of time, hence increasing the risk of mortality as a result of malaria. There is need for educative communication on seeking proper treatment for malaria. Such information can cover the importance of seeking proper diagnosis early, as opposed to buying painkillers from nearby drug shops only go to health centre when symptoms persist. In addition information on dangers related to sharing medication or stopping prescribed medication mid-way may need to be developed. This information can best be delivered through BCC campaign on malaria targeting Kabras community.

Communication about malaria prevention and control should employ a combination of channels from radio, posters at health centres and other community locations.

5.4.1 RECOMMENDATIONS FOR FUTURE RESEARCH

This study focused on understanding the people's knowledge and attitude towards malaria, and basic treatment seeking behavior. Further studies can be conducted to adequately understand the myths surrounding malaria that affect their treatment seeking behavior.

A study to check the proportion of drugs that have expired can be conducted to inform the government on risks for the rural farmer succumbing to death because of them. This is especially so since the respondents stated that some do not bother checking on the date of expiry hence putting themselves at risk of even death.

Finally, a study on how the economic well being of the rural residence affect their treatment seeking behavior can be conducted. Understanding the threshold of economic empowerment rural population of Kabras needs to increase their treatment seeking behavior might be of importance to the government. This will help in recommending the scale of BCC the government should invest in.

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APPENDIX

INTRODUCTION/CONSENT FORM

Assessment of community knowledge, attitudes and practices (KAP) study on malaria control and prevention in Kabras North Division, Kakamega County

Good morning/afternoon/evening.

My name is **Puti James Mudogo**. I am from Maseno University School of Mathematics Statistics and Actuarial Sciences. I'm conducting a research about **knowledge, attitudes and practices (KAP) on malaria in this area and will interview several people about malaria issues**.

The information you will give me will enable MOH better understand the community beliefs , practices and needs in relation to malaria so that it can design message relevant to the needs of the people. Participating in this research will benefit you indirectly; information gathered will help MOH develop and design appropriate information resources to increase awareness about malaria control and prevention, enable the community to recognize the signs and symptoms of malaria and also know when to seek medical attention, to reduce malaria incidence.

Your participation in this study is voluntary. If you do not want to participate in this research, feel free to say no. you are free not to answer any questions you may not be comfortable with. You may also stop the interview at any time. If you have any questions about the survey, you can contact the researcher on **0727147880**, email: `jmputi@yahoo.com`. The answers you provide will be confidential and your anonymity

will be ensured since they will be part of other interview responses from other members. The interview would take 20-30 minutes. Would you be willing to participate?

If yes continue the interview and If no, stop here

RESEARCH QUESTIONNAIRE

Assessment of Knowledge, Attitudes and Practices regarding Malaria Prevention and Control among households in Kabras North Division Kakamega County.

Date .....

Enumerator .....

(To be filled by the entry person before entering the data of this questionnaire)

Part I: Demographics

Q101	Name of sub-location	.....
Q102	Sex of respondent	Male .....1 Female 2
Q103	How old are you? (Tick only one box)	15-20 ..... 1 21-30 ..... 2 31-40 ..... 3 41-50 ..... 4 51-60 ..... 5 Above 60 6
Q104	What is the highest level of education that you have achieved? (Tick only one box)	No formal education 1 Primary school (1-4) 2 Primary school (5-8) 3 Secondary .... 4 College/University 5

Q105	How many people live in your household including you? (include your biological children or other dependents, tick only one box)	Six or more . . 1 Four or five . . 2 Three . . . . . 3 Two . . . . . 4 One 5
Q106	What is your occupation? (Tick only one box)	Gov?t employee 1 Private employee 2 Farmer . . . . 3 Housewife . . 5 Daily labourer . 6 Unemployed . 7 Merchants . . . 8 Others specify .
Q107	What is your estimated monthly income?	. . . . .
Q108	Your house structure ?wall make up	Cement block . 1 Mud and clay . 2
Q109	What is the major construction material of the roof?	Grass . . . . . 1 Mabati 2
Q110	Does any member of your household own electronic equipment/Have access to media? (Tick only one box)	Yes . . . . . 1 No 2
Q111	If yes for Q110, what kind? (Tick all that apply)	Radio . . . . . 1 TV . . . . . 2 News paper . . 3 Other 4

Part II: Basic knowledge about Malaria

Q201	Have you ever heard of Malaria? (Tick one only)	Yes . . . . . 1 No . . . . . 2 I don?t know 3
Q202	If yes for Q201, which vector transmits Malaria to humans? (Tick one only)	Rat . . . . . 1 Dog . . . . . 2 Mosquito . . . . . 3 Fly . . . . . 4 Cockroach . . . . . 5 I don?t know 6
Q203	How is malaria transmitted to humans?	Drinking contaminated water 1 Chewing a lot of sugarcane 3 Bite of mosquito . . . . . 4 Contact with malaria patient 5
Q204	Do you think malaria can kill you if it?s untreated?	Yes . . . . . 1 No . . . . . 2 I don?t know 3
Q205	What do you think are the most common signs of malaria infection? (Tick all that apply)	High temperature/Fever . . 1 Loss of energy . . . . . 2 Vomiting . . . . . 3 Sweating . . . . . 4 Headache . . . . . 5 Body pains . . . . . 6 Itching . . . . . 7 Loss of appetite 8

		Chills . . . . . 9 Dizziness . . . . . 10 I don?t know . . . . . 11 Other (describe) . . . . .
Q206	Which of these are ways to prevent and control malaria (Tick all that apply)	Sleeping in bed nets . . . . 1 Wearing long sleeved clothes 2 Making fire and smoke . . 3 Spraying insecticide . . . . 4 Trimming of bushes around the house pain . . . . . 5 Cleaning dark corners in the house . . . . . 6 I don?t know 7
Q207	When do malaria mosquitoes bite? (Tick only one)	Daytime . . . . . 1 Night time . . . . . 2 Both day and night time . . 3 I don?t know 4
Q208	What personal protection measures do you use to guard yourself/family against malaria? (Tick all that apply)	Use repellents . . . . . 1 Use mosquito coil . . . . . 2 Use doom . . . . . 3 Burn cow dung/leaves . . . 4 Close windows and doors . 5 Gauze wire in windows . . 6 Use mosquito nets . . . . . 7 Do nothing . . . . . 8 Others (specify) 9

Part III: Bed net ownership and use

Q301	Does this household have bed nets?	Yes . . . . . 1 No 2
Q302	If yes for Q301, who owns the available nets in this household? (Tick as many)	Father . . . . . 1 Mother . . . . . .2 Children over five years 3 Children under five years 4 Others 5
Q303	Are all these bed nets being used?	Yes . . . . . 1 No . . . . . .2 Don?t know 3
Q304	If No to Q303,why	. . . . .

Part IV: Sources of information about malaria

Q401	Have you ever heard or received any information about malaria? (Tick only one)	Yes . . . . 1 No . . . . 2 I don?t know 3

Q402	If yes for Q401, from which sources have you heard or received information about malaria? (Tick all that apply)	Family member (at home) 1 Neighbour (in the village) 2 Radio . . . . . 3 Television . . . . . 4 Newspaper . . . . . .5 Posters/pamphlets . . . . 6 School . . . . . .7 Church . . . . . .8 Health centre/clinic . . . 9 Community health worker 10 Drug shop . . . . . .11 Other (describe) . . . . .

Part V: Treatment seeking behaviour

Q501	Have you or any member of the household suffered from malaria in the last six months(Tick only one)	Yes . . . . . 1 No . . . . . 2 Don?t know 3
Q502	If you or a member of the household were to present with signs and symptoms of malaria, where would seek a treatment	Health center/ clinic . 1 Community health work 2 Traditional healer . . . 3 Drug shop/pharmacist . 4 Look for local herbs . 5 Nowhere . . . . . 6 I don?t know . . . . . 7 Other (describe) . . . .

Q503	How soon after suspecting malaria would you seek treatment?	One day (within 24 hours) 1 2-3 days . . . . . .2 4-6 days . . . . . .3 7 days or more . . . . .4 I don?t know 5
Q504	If you do not seek treatment immediately (within 24 hours), what would you do?	. . . .
Q505	Do you think you have enough information about malaria? (tick only one)	Yes . . . . . .1 No . . . . . .2 I don?t know 3
Q506	If No, what information would like to get about malaria?	Information on treatment 1 Information on control . 2 Information on prevention 3 Signs and symptoms . . 4 Nature of the disease . . 5 Any information . . . . 6 I didn?t know . . . . . 7 Other . . . . .

Q507	How would you like this information communicated to? (tick all the apply)	Family member(at home) 1 Neighbor (in the village) 2 Radio . . . . . 3 Television . . . . . 4 Newspapers . . . . . 5 Posters/pamphlets . . . 6 School . . . . . 7 Church . . . . . 8 Village health team . . . 9 Community health work 10 Health centre/clinic . . 11 Drug shop/drug hawker 12 Other (describe) . . . . .

Part VI: Attitudes towards Malaria

		Strongly Disagree	Disagree	Agree	Strongly Agree
		[1]	[2]	[3]	[4]
Q601	I think malaria is a serious and life-threatening disease				
Q602	Malaria can be transmitted from one person to another like common cold				
Q603	I think the best way to prevent myself getting malaria is to avoid getting mosquito bites cold				

		Strongly Disagree	Disagree	Agree	Strongly Agree
		[1]	[2]	[3]	[4]
Q604	I am sure that anyone can get malaria				
Q605	I believe sleeping under mosquito net is one way to prevent myself getting malaria				
Q606	I am sure I can treat myself when I get malaria				
Q607	In my opinion, only children and pregnant women are at risk of malaria				
Q608	I think one can recover spontaneously from malaria without any treatment				
Q609	If someone has got malaria, people should avoid having close contact with him/her				
Q610	I might be at greater risk of getting malaria if I work and sleep overnight in the garden or forest				
Q611	I think that is dangerous when malaria medicine is not taken completely				

		Strongly Disagree	Disagree	Agree	Strongly Agree
		[1]	[2]	[3]	[4]
Q612	I can buy anti-malaria drugs from the drug shop/pharmacy to treat myself when I get malaria				
Q613	I think that I should go to the health centre /clinic to have my blood tested as soon as suspect that I have suffered from malaria				
Q614	I will seek for advice or treatment when I get malaria				
Q615	In my opinion, it is very important to check for an expiry date of the drug before taking it.				

PARTVII: Practices towards malaria prevention

		Always	Sometimes	Never
		[1]	[2]	[3]
Q701	How often do you sleep in treated mosquito net			
Q702	How often do other members of the house hold sleep in mosquito nets?			
Q703	How often do you check for holes / repair mosquito nets			

		Always	Sometimes	Never
		[1]	[2]	[3]
Q704	How often do you use mosquito repellent coils on your house?			
Q705	How often do you clean/cut bushes around your house?			
Q706	How often do you clean stagnant water near your house?			
Q707	How often do you visit health centre when you fall sick?			
Q708	How often do you use anti-mosquito spray in your house?			
Q709	How often do you receive visits from the village health team?			

END

THANK YOU