

Malaria Prevention And Treatment Practice Among Mothers With Children Under Five In Central Region, Ghana

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Abstract: Despite the strenuous efforts by many African governments and their development partners to eradicate malaria especially among children and their mothers, not much has been achieved as it continues to be the leading cause of mortalities in these countries. Ghana, through its implementation agencies, has been implementing series of intervention programmes such as sensitisation campaigns on the causes, symptoms, preventive and treatment measures. Therefore, this study sought to investigate the knowledge of mothers with children under age five in some selected districts in the Central Region. The Strategies they use to protect the children from malaria and the possible treatment options that are available.

The study employed a quantitative descriptive design. A questionnaire was designed and administered to 333 randomly selected respondents after it was pilot-tested. The analysis was done using both the descriptive and inferential statistical tools in the SPSS.

It was found that although overwhelming majority of the respondents had ever heard of malaria, there was generally low level of knowledge on the causes, symptoms, preventive and treatment practices of malaria among them. Also, the main factors influencing mothers' choice of treatments for their children were family acceptance and quality of care. The study concluded that education of mothers is critical in efforts to reduce incidence of malaria among children in these districts.

Keywords: Malaria, Prevention, Treatment

I. INTRODUCTION

BACKGROUND TO THE STUDY

Malaria, a disease caused by plasmodium parasite is widespread in the tropics and subtropics. It is characterized by chills, fever and in the most severe cases, coma leading to death (Appiah-Darkwah, & Badu-Nyarko, 2011). In endemic areas mortality is principally in infants. Those who survive to adulthood acquire significant immunity (Kumar & Clark, 2011). Malaria is transmitted mainly through the bites of *Anopheles* mosquitoes. Occasionally it is transmitted in contaminated blood (transfusions, contaminated equipment, injecting drug users sharing needles) (Kumar & Clark, 2011). The intensity of transmission depends on factors related to the parasite, the vector, the human host, and the environment.

Globally malaria results in an estimated 500 million infections and more than 1 million deaths each year (Kumar & Clark, 2011). Research findings suggest that about half of the world's population is at risk of malaria and that it is endemic in more than 100 countries (Dasgupta, Blankespoor, Lagnaoui, & Roy, 2013). World Malaria Report (WMR) in 2011 reviewed that, 216 million people were infected with malaria in 2010, and out of this number 655,000 people died of the disease. 81% of the people infected and 91 % of those who died were in sub-Saharan Africa and were mostly pregnant women and children. The report concluded that malaria is the leading cause of death for children under five years of age (WMR, 2011).

Malaria transmission is endemic in majority of countries in the sub-Saharan regions of Africa, as sustained transmission

of the disease occurs either throughout the year or seasonally (Randell, 2008).

Malaria is a major cause of child mortality; responsible for 7% of deaths in children under the age of five years globally and 15% of those in Africa (Liu et al., 2012). The burdens associated with malaria include: increased poverty, impaired learning and reduced attendance in schools and work places. The economic effects of malaria infection can be tremendous. These include direct costs for treatment and prevention, as well as indirect costs such as lost in productivity due to morbidity and mortality; time spent seeking treatment, and diversion of household resources (Osei-Kuffour, 2008). A long term sequelae associated with malaria includes loss of quality of life. A study by Sicuri, Vieta, Lindner, Constenla and Sauboin, (2013), on the economic costs of malaria in three sub-Saharan African countries associated with children under age five indicates that national annual costs for the prevention and treatment of malaria in these children corresponded to 0.14%, 0.62% and 0.36% of the Gross Domestic Product (GDP) of Ghana, Tanzania and Kenya respectively.

Ghana is regarded as a malaria hyper-endemic country (Belay & Deressa, 2008). Malaria accounts for 44% of outpatient attendance, 13% of all hospital deaths, and 22% of mortality among children less than five years of age (Belay and Deressa 2008). Ghana records about 3.2 million malaria cases annually with about 38,000 of these cases leading to death (Belay and Deressa 2008).

Malaria is estimated to cause the loss of about 10.6% Disability Adjusted Life Years in Ghana and costs an equivalent of up to 6% of the country's Gross Domestic Product (GDP) annually (Laar, Laar, & Dalinjong, 2013).

Although malaria is such a big problem, there are effective interventions to prevent or reduce malaria burden among the populations (Chamatambe, 2008). It is claimed that, bed nets, window screens, house sprays, ceilings, closed eaves and in some cases, zoo prophylaxis can reduce the risk of malaria (Yamamoto, Louis, Ali, & Sauerborn, 2009).

One of the targets of the Millennium Development Goals Six (MDG 6) is to reverse the incidence of malaria to half by the year 2015. The vision of the Roll Back Malaria (RBM) Partnership was a world free from the burden of malaria as of 2007. The World Health Assembly and the RBM Partnership had consistent goals for intervention coverage and impact for 2010 and 2015. The coverage is meant to reach more than or 80% by year 2010 and 100% by 2015 with four key interventions: insecticide treated nets (ITNs) for people at risk, appropriate anti-malarial medicines for patients with probable or confirmed malaria, indoor residual spray (IRS) for targeted households at risk and intermittent preventive treatment in pregnancy in moderate-to-high transmission settings. The global impact targets are a reduction in the number of malaria cases and deaths per capita by 50% or more between 2000 and 2010, and by 75% or more between 2010 and 2015 (Otchere, 2011). Achieving these goals needs universal access to and utilisation of malaria prevention and treatment strategies (WHO, 2011). There are currently a number of effective tools available, such as long-lasting insecticide treated bed nets, indoor residual spraying and artemisinin-based combination therapies (ACT). Use and high coverage of ITNs in African

settings has repeatedly shown to reduce all-cause mortality by 20% (Nejla, 2007).

The main methods for malaria prevention could be divided into two; vector control method and chemoprevention. Vector control mainly consists of insecticide-treated bed nets (ITNs), indoor residual spraying (IRS) and, in some cases, larval control (Yadav, et al., 2014). Chemoprevention is a term referring to the prophylactic use of antimalarial drugs in high risk groups, most often pregnant women or infants (Konaté, Yaro, Ouédraogo, Diarra, Gansané, et al., 2011). IRS is said to be highly-effective strategy for combating malaria and could provide a lasting impact in areas of intense transmission (Konaté, Yaro, Ouédraogo, Diarra, Gansané, et al., 2011).

The effectiveness of ITNs in reducing malaria morbidity and mortality has been documented in areas of both high and low malaria transmission, and among children as well as adults (Koudou et al., 2010; Gamble et al., 2007; Fegan et al., 2007). According to Otchere, (2011), the report of the second International Conference on insecticide treated bed nets that was held at Dar es Salaam in Tanzania, revealed that, the lives of about 400, 000 children could be saved every year if every child under five years of age in Africa slept under a treated net (Otchere, 2011). Furthermore, insecticide treated net repels mosquitoes and shorten the life of the mosquito. The use of mosquito nets has consistently shown a reduction in malaria cases and overall mortality related to malaria (Sougoufara et al., 2014). Environmental management is a promising technique for vector control, as it alters these micro-environmental conditions in order to decrease the available breeding habitat for mosquitoes by removing stagnant or slow-moving water sources (Randell, 2008). Pruss-Ustun and Corvalan, (2006) estimated that 42% of the malaria burden in sub-Saharan Africa could be prevented by environmental management. Another way to prevent or limit malaria mortality is early diagnosis and prompt treatment with appropriate medication (Uche et al., 2009).

In an attempt to control malaria, Ghana made an attempt to control its spread. Since the health sector alone was assumed to be incapable of controlling malaria, the other health-related sectors were involved. Some of the interventions that were put in place included indoor residual spraying (IRS), mass chemoprophylaxis with pyrimethamine medicated salt and draining of sewage system. With all these interventions, malaria continued to be the leading cause of death in Ghana (Oppong, 2012).

STATEMENT OF THE PROBLEM

Over 78% of malaria deaths are estimated to occur in African children under five years of age (World Malaria Day, 2015). Currently, malaria is the leading cause of death for children under five in the continent, accounting for one in five deaths, malaria accounts for about 25% of all deaths in children under- five years (InterAction, 2013). Malaria in Ghana is recognized as a leading public health problem. It is responsible for about 45% of out-patient cases and it is the leading cause of cases admitted to hospital. Malaria has been identified as one of the major causes of poverty and low productivity in Ghana (Dakubo 2010). A report by the National Malaria Control Programme (NMCP) suggested that,

about 11.3 million cases of malaria were recorded in Ghana in 2013. Children under five years of age were the most affected. Every 30 seconds a child dies from malaria (Johns Hopkins Malaria Research Institute (JHMRI), 2016). Early diagnosis and appropriate treatment are essential to reduce morbidity and mortality related to malaria among this group.

According to Mwensi, (2003) as cited by Uneke, (2009), a significant percentage of malaria-like illness is first recognized and defined at home. Understanding mothers' preventive practices and their treatment-seeking behaviors is important because mothers are important factors in the outcome of malaria infection in children. Although studies by Appiah-Darkwah, & Badu-Nyarko, (2011) and De La Cruz (2006) review that mothers have some knowledge about malaria, little is known about their preventive practices and the treatment-seeking behaviors among mothers with children under five years of age. Information on people's knowledge about the disease, their attitudes towards prevention and control methods as well as the various actions they take to prevent and control the disease is vital to successful management of the disease (Appiah-Darkwah, & Badu-Nyarko, 2011). This study therefore is to bridge the gap of knowledge in this area, as Ghana is ready to implement home malaria management (HMM).

PURPOSE OF THE STUDY

The purpose of the study is to investigate the malaria prevention and treatment option among mothers with children under age five in selected districts in the Central Region.

OBJECTIVES OF THE STUDY

The study objectives are to:

- ✓ Assess the level of knowledge of mothers on malaria.
- ✓ To find out if there is an association between the mothers' formal education and their knowledge on malaria
- ✓ Determine malaria preventive practices among mothers in selected districts in Central Region.
- ✓ Describe patterns of treatment-seeking behavior among mothers within the selected districts in Central Region.

RESEARCH QUESTIONS

- ✓ What is the level of knowledge of mothers on malaria?
- ✓ Is there any association between mothers' Knowledge on Malaria and their education Level?
- ✓ What are the preventive practices mothers in the selected districts in Central Region use to protect their children from getting malaria?
- ✓ What are the treatment practices among mothers when their children get malaria?

SIGNIFICANCE OF THE STUDY

Significant efforts have been made in recent years to improve malaria control. However, malaria still remains a major public health problem in sub-Saharan Africa. It is responsible for about 800,000 deaths annually (Konaté et al., 2011). Malaria is still the leading cause of mortality in Ghana

mostly affecting children under five years of age. A study on how mothers protect their children from malaria and how they treat their children when they get malaria would help to improve mothers' preventive practices and their treatment options. Another significance is that the study could provide information on how to fight against malaria in the region. And lastly would contribute to the body of nursing knowledge on malaria prevention and treatment among mothers.

RESEARCH DESIGN

A descriptive study was applied. Although there are other research designs like qualitative, the researcher used quantitative method since it is more reliable and objective. Another reason for this method is that it is cost effective and is regarded as more feasible in a relatively short time which makes it available than other study designs. Descriptive design also helped the researcher to report frequencies, averages and percentages that was used in the discussion and gave room for generalization. Although quantitative method has its weaknesses, it was most appropriate for this study.

RESEARCH SETTING

The study was conducted at Mfantseman and Assin South districts in the Central Region. The region has 20 administrative districts with the city of Cape Coast as the capital (Ghana Health Service, 2013). The region enjoys two main raining seasons in a year. The major raining season occurs in the months of April to July, peaking in June. The minor raining season peaks in October and spans the months of September to November. The vegetation is divided into dry coastal savannah stretching about 15 km inland, and a tropical rain forest covering areas of hinterland. The region had an estimated 2012 population of 2,413,050 with an annual growth rate of 3.1% (GHS, 2012). The climate and the rainfall pattern exposes the region to malaria.

Malaria remains the most common reason for people attending to health facility in the Region. Malaria cases of children under age five formed 43.49% of all the OPD under five attendances in 2013 (Ghana health Service 2013). Central Region has in all 193 health facilities comprising 77 public, 100 private and 16 mission/quasi. In addition, the region has 15 functional Community-based Health Planning and Services (CHPS) compound in six districts. All these facilities are capable of managing malaria. Although the two districts were selected by random sampling, malaria is the major cause for hospital attendance there.

POPULATION

The study population were made up of mothers with children under age five years within the districts of Mfantseman and Assin South in the Central Region.

INCLUSION CRITERIA

- The study included mothers:
- ✓ Who agreed to participate in the study and have children below age five.

- ✓ Were able to give informed consent.
- ✓ Who live in the selected communities.
- ✓ Who were able to communicate verbally.

EXCLUSION CRITERIA

Mothers who did not agree to participate in the study and those whose children were above age five were excluded from the study. Also mothers who were not able to communicate with the interviewer and mothers who were visitors were excluded.

SAMPLE SIZE

In all, a total of 333 mothers were selected for the study. This was based on the formula: $n_o = Z^2 (p*q)/e^2$ (Cochran 1963) Where, n_o = sample size, Z = Statistical certainty chosen p = Estimated prevalence on mother's knowledge. $q = 1-p$, e = desired level of precision. Therefore, using $z=1.96$, $p=0.70$, $q=0.30$, and $e =5\%$ (0.05) with the confidence level 95% interval and the assumption of 70% of patients with adequate knowledge (De La Cruz et al., 2006). Therefore, $n_o = 1.96^2(0.70 \times 0.30)/0.05^2 = 322$

SAMPLING AND SAMPLING TECHNIQUE

Simple random technique was used to select the two districts. The districts along the coast were separated from the districts in the forest belt, they were placed into two different boxes and randomly one district was selected from each box. Three towns were randomly selected from each of the districts. The names of all the towns were written on pieces of papers, folded, put in two different containers and shaken thoroughly and three were picked from each of them. Six communities were selected in all. Fifty-five respondents were selected from each of the communities. Purposive sampling technique was used to select the respondents from each town. Mothers with children under the age of five were selected from the houses. Simply random technique was used to select one mother from the houses where more than one mother was met with child under the age of five years.

INSTRUMENTATION

A prepared open ended and closed ended questionnaire was used for the study. The questionnaire was in four sections; the socio-demographic data including mothers' age, marital status, and occupation, child's age and gender. Mother's knowledge on malaria and the available preventive methods, were the section B. preventive methods the mothers used was the section C. The section D the last section was the health seeking behaviour, decisional control that is decision making in the home, included questions on the sources of care, medication utilisation and household direct and indirect costs experienced as a result of the child's illness.

PRE-TEST OF DATA COLLECTION INSTRUMENTS (TOOLS)

Pre-test or pilot study was conducted in mothers with children less than five years of age in the Cape Coast Municipality the capital city within the region. Three nurses: one Master of nursing student and two health care assistance were taken through the questions, the researcher discussed with them the rationale for the study and provided them background information on malaria. The training captured areas such as, how to observe office protocol, how to select the patients, informed consent seeking from clients and how to check and verify the questionnaire after completion by participants. Twenty questionnaires were used for the pretesting.

The Cronbach's alpha was used to estimate the internal consistency reliability (Kimberlin, and Winterstein, 2008). The time needed for instruction and completion of the instruments was determined from the pilot procedure as well as determining clarity of instruction and restructuring of the questionnaire. The pre-test resulted in quite a number of modifications, but the result of the pilot did not form part of the analysis for the main study. The use of piloting increased the validity of the data by ensuring that the questions were clear and unambiguous. Reliability coefficients ranging from 0.00 to 1.00, with higher coefficients indicating higher levels of reliability was used to determine the validity and the reliability of the questionnaire. The reliability coefficient for all the questions were 0.903

ETHICAL CONSIDERATION

Ethical approval was obtained from the Institutional Review Board of University of Cape Coast. Copies of the approval letter of institutional review board were used to seek permission from Central Regional Health directory, traditional chiefs and opinion leaders in all communities, as well as from the Assembly men and women of all electoral areas. Informed written consent was also sought from all respondents. They were assured of maximum confidentiality and the right to opt out at any point during data collection after being briefed of the objectives and rationale of the study.

To ensure confidentiality and the anonymity, participants were informed that the researcher and the assistance would do their best to protect the information they will provide. Their identity would not be disclosed to anybody outside the group. Also participants were given the assurance that not even the researcher would be able to link a participant with their personal data. The answered questionnaires were kept under lock to ensure confidentiality and re-organized for efficient analysis. Access to the data was limited to only the researcher at the initial stage of the research till completion.

DATA COLLECTION

Data collection was conducted within six weeks. Each week was used for one community. The trained research assistants administered the questions to the research participants one at a time. They read the questions and interpret them to the respondents who could not fill the

questionnaires on their own because they could not read and understand, and recorded their responses accordingly.

DATA ANALYSIS

Computer software Statistical Package for Social Science (SPSS) version 20 was used for the data entry and analysis. The data from the questionnaire were coded and fed into the computer for onward analysis based on the study objectives and the main study variables. Reliability was ensured by double data entering. The researcher employed both descriptive and inferential statistical tools in analysing the data. Among these statistical tools were frequencies, percentages, tables, graphs, and the Chi-square test. Results were presented in tables and graphs and interpretations of findings were made as possible.

II. RESULTS AND DISCUSSION

The study investigated the malaria prevention and treatment option among mothers with children under age five from two selected districts in the Central Region. It specifically sought to answer the following research questions:

- ✓ What is the level of knowledge of mothers on malaria?
- ✓ Is there any association between the mothers' education and their knowledge of malaria?
- ✓ What are the preventive practices mothers in the selected districts in Central Region use to protect their children from getting malaria?
- ✓ What are the treatment practices among mothers when their children get malaria?

Out of the 333 targeted sample respondents, 331 of them completed and returned their copies of the questionnaire. This means that the study attained a 99.4% retrieval rate. The researcher employed both descriptive and inferential statistical tools in analysing the data. Among these statistical tools were frequencies, percentages, tables, graphs, the Chi-square test and the Exploratory Factor Analysis (EFA).

SOCIO-DEMOGRAPHIC CHARACTERISTICS OF RESPONDENTS

Data on the characteristics of the respondents were collected to have a fair understanding of the background of the respondents in the study. The characteristics examined included age, marital status, number of children, number of children aged under 5 years, religion, level of education, occupation, and monthly family income. Table 1 presents the details of their socio-demographic characteristics.

Variables	Frequency	Percentage
Age (in years)		
15 – 19	7	2.1
20 – 24	47	14.2
25 – 29	51	15.4
30 – 34	54	16.3
35 – 39	61	18.4
40 and above	111	33.5
Marital Status		
Married	202	61.0

Single	59	17.8
Widowed	14	4.2
Divorced	45	13.6
Co-habitation	6	1.8
Non-response	6	1.8
Number of Children		
1	59	17.8
2 – 3	137	41.4
4 and above	135	40.8
Under-5 Year Children		
1 year	146	54.3
2 years	94	34.9
3 years	29	10.8
Religion		
Christianity	314	96.1
Islam	8	2.4
Traditional	4	1.2
Others	1	0.3
Level of Education		
No formal education	63	19.0
Primary	56	16.9
JHS/Middle	159	48.0
Secondary	44	13.3
Tertiary	9	2.7
Occupation		
Farming/Fishing	54	16.3
Petty trading	150	45.3
Civil service	9	2.7
Self-employed	91	27.5
Others	27	8.2
Monthly Family Income (in GH¢)		
Less than 500.00	225	68.0
500.00 – 999.00	28	8.4
1000.00 and above	6	1.8
Non-response	72	21.8

Table 1: Socio-Demographic Characteristics of Respondents

The results from Table 1, showed a larger proportion of the respondents were also found to be 40 years or more, therefore, representing the modal age of the respondents.

With regard to their marital status, majority 61% of the respondents indicated that they were married. Similarly, 59 (17.8%) and 45 (13.6%) were single and divorced, respectively, while 20 (6.0%) were either widowed or cohabitating. However, 6 (1.8%) of the respondents refused to indicate their status. In a related development, about 41% of the respondents had between 2-3 children, while almost 41% had at least 4 children. Fifty-nine representing 17.8% of the respondents had just a child. More than half of them (54.3%) were having only one child under five years. Similarly, 94 (34.9%) and 29 (10.8%) of the respondents were having 2 and 3 children, respectively.

The results further showed that majority of the respondents were Christians compared to Muslims (2.4%) and traditionalists (1.2%). A larger proportion of the respondents (48.0%) were found to have completed Junior High or Middle schools. Moreover, 44 (13.3%) and 9 (2.7%) had obtained secondary and tertiary levels of education, respectively. However, 19% of the respondents had no formal education.

With regard to their occupations, the study found that a substantial proportion of the respondents (45.3%) were into petty trading. Ninety-one representing 27.5% were self-employed, while 54 (16.3%) either farmed or fished. Consequently, a significant number of the respondents (68.0%) indicated that their household income was less than GH¢ 500.00 per month. Whilst 28 (8.4%) reported of a family income of GH¢500-999, 6 (1.8%) indicated at least GH¢ 1000. As many as 72 representing 21.8% did not respond to this item probably because they had no family incomes or had forgotten.

RESEARCH QUESTION 1: WHAT IS THE LEVEL OF KNOWLEDGE OF MOTHERS ON MALARIA?

This research question sought to measure the level of knowledge of mothers on the causes, symptoms and preventive measures of malaria among children. Ewing, (2012) said that knowledge regarding the causes of and appropriate responses to malaria symptoms determine what action, if any, is taken by patients or caregivers. To this end, the respondents were asked several questions to assess their understanding on the subject. Figure 1 gives the responses of the respondents on whether they had ever heard about the term “malaria” or not.

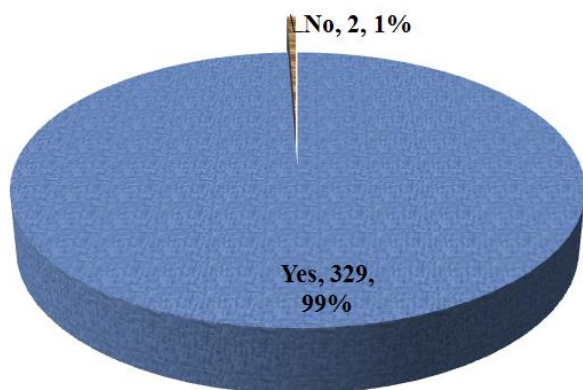


Figure 1: Familiarity with the term “malaria”

Figure 1 shows that almost all of the respondents (99%) reported of ever hearing about malaria. Meanwhile, 2 representing 1% of them had not heard about it before. This means that despite the huge sensitisation and education on malaria via different media, there are a few who are still unaware of this sickness.

Table 2 presents the analysis on respondents’ knowledge on the possible causes of malaria among children under five years of age. Frequencies and percentages were computed for discussion.

Causes	Yes		No	
	Freq.	%	Freq.	%
Too much sun	7	2.1	322	97.9
Mosquitos	279	84.3	50	15.7
Malnutrition	43	13.0	286	87.0
Dirty environment	138	41.7	191	58.3
Flies	11	3.3	318	96.7
Chilled climate	0	0.0	329	100.0
Witchcraft	0	0.0	329	100.0
Others	17	5.1	312	94.9

Table 2: Knowledge on Causes of Malaria

On the causes of malaria, almost all the respondents disagreed that too much sun could cause malaria in their children. However, a few of the mothers said ‘too such sun’ was a cause of the sickness. Mosquitos are generally believed to be scientifically responsible for the spread of malaria among both children and adults. A large majority of the respondents (84.3%) correctly agreed that it was the cause of malaria among their children, while 15.7% got it wrong by disagreeing.

On whether malnutrition was a cause of malaria or not, 87% of mothers responded in the negative. Interestingly, as much as 41.7% of the respondents also held the view that dirty environment was responsible for malaria among children although not true. Correctly, a significant proportion of the mothers (96.7%) disagreed with the case that flies were the cause of malaria. With regard to chilled climate and witchcraft, all of the mothers responded in the negative that they could cause malaria in their children.

It can be deduced from the above responses that the respondents still had some amount of erroneous views about what causes malaria especially among children. Out of the seven so-called causes listed in Table 2, it is only mosquitoes that could cause malaria. Therefore, mosquito was the sole correct answer.

In respect to questions on the symptoms of malaria among their children, the responses obtained were analysed using frequencies and percentages and presented in Table 3.

Symptoms	Yes		No	
	Freq.	%	Freq.	%
Weakness	138	41.7	191	58.3
Chills	103	31.1	226	68.9
Headache	142	42.9	187	57.1
Yellow urine	39	11.8	290	88.2
Sweating	36	10.9	293	89.1
Fever	241	72.8	88	27.2
Diarrhea	64	19.3	265	80.7
Vomiting	123	37.2	206	62.8
Loss of Appetite	137	41.4	192	58.6
Convulsion	67	20.2	262	79.8
Average	109	32.9	220	67.1

Table 3: Knowledge on Symptoms of Malaria

It must be noted that all the above-mentioned symptoms were symptoms of malaria among children. However, the results in Table 3 depict that some respondents have no idea specifically, as to whether weakness of a child was a symptom of malaria or not, more than half of the respondents (58.3%) responded in the negative. Similarly, a large majority of the mothers (68.9%) believed that chills was not a symptom of malaria. Meanwhile, 31.1% of the respondents said chills was a symptoms of malaria. One hundred and eighty-seven representing 57.1% said that headache among children was not a symptoms of malaria. Although it is believed that yellow urine in a child signifies the presence of malaria, as many as 290 (88.2%) of respondents thought otherwise. Similarly, only 10.9% of the mothers said that sweating was a malaria symptom.

With regard to fever, majority of mothers (72.8%) agreed that it was a symptom of malaria. Diarrhea, loss of appetite, vomiting and convulsion were not generally viewed by the

mothers as possible symptoms of malaria in their children. Therefore, on the average, it was seen that only 109 (32.9%) of the respondents had adequate knowledge on the symptoms of malaria in children.

Furthermore, the study sought to find out from the respondents the possibility of transmitting malaria. The pie chart showed their responses on this

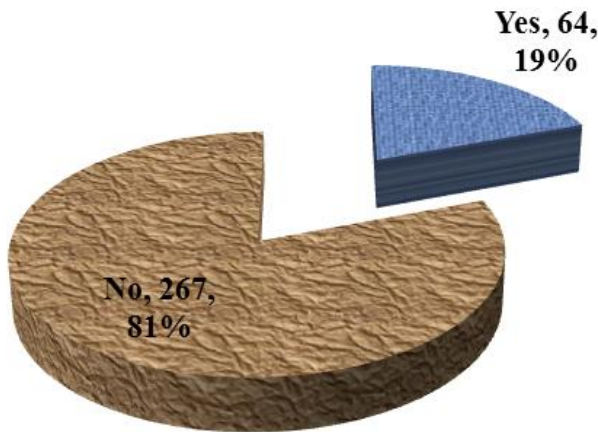


Figure 2: Respondents' views on whether malaria can be spread or not JHH

Figure 2 reveals that a large majority of the respondents (81%) said that malaria could not be transmitted, while the remaining 19% said otherwise. Again since there is a high possibility of the spread of malaria especially from mother-to-child. Malaria parasite is found in red blood cells of an infected person so therefore, it can be transmitted through blood transfusion, organ transplant, or the shared use of needles or syringes contaminated with blood, but not through breast milk. However, 98% of the respondents believed that malaria among children could be prevented as shown in Figure 3.

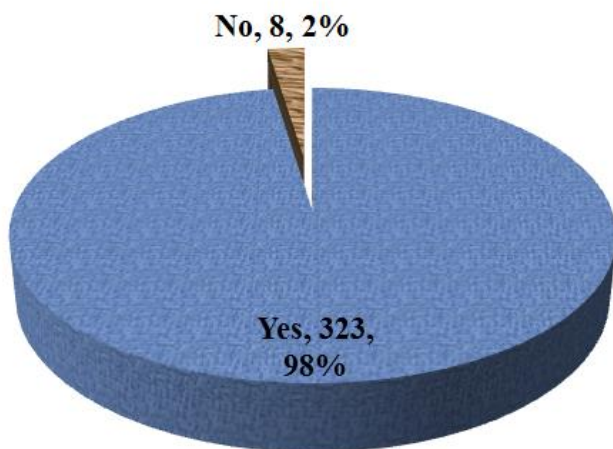


Figure 3: Respondents' views on whether malaria can be prevented or not

On possible malaria prevention methods, the respondents were asked to identify some of them. Table 4 is a summary of their response.

Prevention methods	Yes		No	
	Freq.	%	Freq.	%
Use of insecticide treated net (ITN)	252	76.1	79	23.9
Insecticide spray	120	36.3	211	63.7
Mosquito coil	115	34.7	216	65.3
Repellent cream	26	7.9	305	92.1
Window net	37	11.2	294	88.8
Antimalarial drug	12	3.6	319	96.4
Resting enough	1	0.3	330	99.7
Burning herbs	18	5.4	313	94.6
Clean surroundings	139	42.0	192	58.0
Taking herbs	5	1.5	326	98.5
Avoiding too much heat	5	1.5	326	98.5
Good nutrition	76	23.0	255	77.0

Table 4: Knowledge on Malaria Prevention Methods

A large majority of them (76.1%) had indicated that the use of insecticide treated net (ITN) was a way to prevent malaria among their children. A substantial proportion of them (23.9%) however did not know of this method. There was less knowledge on the use of insecticide spray and mosquito coils as malaria preventive technique among children under 5-years as only 36.3% and 34.7% of them respectively indicated.

The knowledge level of respondents about the use of repellent cream and window net was relatively low 92.1 and 88.8%, respectively of the mothers did not know about these methods. Similarly, only 12 (3.6%), 1 (0.3%) and 18 (5.4%) of the 331 respondents respectively said they knew of antimalarial drugs, resting enough and burning herbs as ways to prevent malaria from attacking their children.

About the cleaning of their surroundings, a good number of the respondents 139 (42.0%) said that this could prevent malaria, while most of them thought otherwise. Little was known about herb taking and avoiding of too much heat as preventive methods of malaria. On good nutritional practices as malaria prevention tool, 76 (23.0%) agreed, while a large majority (77.0%) did not believe this.

RESEARCH QUESTION 2: IS THERE ANY ASSOCIATION BETWEEN MOTHERS' EDUCATIONAL LEVEL AND THEIR KNOWLEDGE ON MALARIA?

This research question sought to measure the relationship between mothers' educational level and their level of knowledge on the causes, symptoms and preventive measures of malaria among children. Table five shows the association between the mothers' education and their knowledge on the causes of malaria.

Educational level	Knowledge Level		
	Adequate	Total	%
No formal education	50	63	79.36
Primary	45	56	80.35
JHS/Middle School	134	159	84.27
Secondary	39	44	88.63
Tertiary	9	9	100

$$\chi^2=4.223, df=4, p=.377$$

Table 5: Test of Association between Knowledge on Causes of Malaria and Educational Level of Respondents

Table 5 showed that out of the 63 respondents without any formal education, 50 (79.4%) had adequate knowledge of

the causes of malaria. Similarly, among those with JHS/Middle school level of education, 134 (84.3%) were found to have good understanding of the causes of the disease. All the 9 respondents with tertiary education had adequate knowledge of the cause of malaria. The test of association using the Chi-square test however showed that there was no significant association between the two variables. This means that one's educational attainment does not determine his/her knowledge of the causes of malaria; implying that knowing the causes of malaria was independent of the respondents' levels of education. This is because the *p*-value associated with the Chi-square value of 4.223 was greater than .05

Educational level	Knowledge Level		%
	Adequate	Total	
No formal education	45	63	71.42
Primary	38	56	67.87
JHS/Middle School	119	159	74.84
Secondary	32	44	72.72
Tertiary	8	9	88.88

$$\chi^2=2.263, df=4, p=.688$$

Table 6: Test of Association between Knowledge on Symptoms of Malaria and Educational Level of Respondents

Among the respondents who were with no formal education, as many as 18 (28.6%) did not have knowledge on the symptoms of malaria. Also, 40 (25.2%) of those with JHS/Middle school education were having poor understanding of the symptoms of malaria. Similarly, out of the 44 respondents who had obtained secondary education, 12 (37.5%) of them did not having adequate knowledge of malaria symptoms similar to a respondent among those with tertiary education. The test however showed that there was no significant association between knowledge of malaria symptoms and their educational levels since the *p*-value of .688 was greater than .05.

Educational level	Knowledge Level		Total
	Adequate	Total	
No formal education	53	63	84.12
Primary	48	56	85.71
JHS/Middle School	148	159	93.08
Secondary	38	44	86.36
Tertiary	9	9	100

$$\chi^2=6.434, df=4, p=.169$$

Table 7: Test of Association between Knowledge on Preventive Measures of Malaria and Educational Level of Respondents

On their knowledge levels of malaria preventive measures, 10 out of the 63 respondents who had had no formal education were found to have poor knowledge of the preventive measures of malaria. Among those with primary and JHS/ Middle school qualifications, 48 (85.7) and 148 (93.1%) had adequate knowledge on malaria prevention, respectively. Similarly, those with secondary education, 6 (13.6%) did not have adequate malaria preventive knowledge. However, none of the 9 respondents with tertiary education was found to have lacked knowledge on malaria preventive measures. As to whether there was any significant association between knowledge on malaria preventive measures and respondents' educational levels or not, the Chi-square test

results showed that there was no statistically significant association. This was because the *p*-value of .169 was greater than the significance level of .05.

RESEARCH QUESTION 3: WHAT ARE THE PREVENTIVE PRACTICES MOTHERS IN THE SELECTED DISTRICTS IN CENTRAL REGION USE TO PROTECT THEIR CHILDREN FROM GETTING MALARIA?

The aim of this research question was to determine malaria preventive practices among the mothers in the selected districts. The respondents to protect and prevent their children from getting malaria. Looking at their knowledge on the 12 preventive techniques in Table 4, the researcher gave the mothers opportunity to write down what they practice the night before the study. Their responses are summarised and presented in Table 8.

Practices	Frequency	Percentage
I used the treated mosquito net	144	43.5
I did nothing	101	30.6
Good food and cleanliness	32	9.5
I used mosquito coil only	30	9.2
I kept them indoors and spray	16	5.0
I used the insecticide spray and coil	4	1.1
I used the repellent and net	4	1.1
Total	331	100.0

Table 8: Malaria preventive practices mothers used in the Night before the study

The most used strategy to prevent malaria among children was the use of treated mosquito nets. This is because out of the 331 respondents, 144 (43.5%) reported using this strategy. Others used techniques such as eating of good foods and cleanliness (9.5%), mosquito coils and indoor spray (9.2%). As many as 101 (30.6%) of them said they never did anything to prevent their children from getting malaria.

RESEARCH QUESTION 4: WHAT ARE THE TREATMENT PRACTICES AMONG MOTHERS WHEN THEIR CHILDREN GET MALARIA?

The question sought to describe the patterns of treatment-seeking behavior among mothers within the selected districts. This includes; their immediate treatment seeking behavior, the type of medication they use if any and where they get them. Lastly places where the mothers seek care when their children get malaria. Tables 9 to 12 and figures 5 and 6 sum up the mothers' responses.

Practices	Frequency	Percentage
Go to hospital	141	42.7
Give paracetamol only	55	16.5
Take drug at home (i.e., treat at home)	48	14.5
Sponging only	44	13.3
Sponge and give paracetamol	25	7.7
Sponge and hospital	9	2.8

Give herbal mixture	7	2.0
Give paracetamol and ORS	1	0.4
Total	331	100.0

Table 9: Treatment practices among mothers when their children get malaria?

From Table 9, 141 (42.7%) of the respondents said that they rushed their children straight away to the hospital after finding that their children had malaria. However, 55 (16.5%) said they only administered paracetamol to their children, while 48 (14.5%) reported treating them at home. 44 representing 13.3% indicated that they only sponged their malaria-attacked children. Some also sponged and thereafter give paracetamol, while others sponged their children and rushed them to the hospital. Seven of them representing 2.0% reported using herbal mixtures to treat their children, while a respondent said she used paracetamol and ORS for treating her child. In order to know the proportion of respondents who treated their children at home, Figure 4 presents the results.

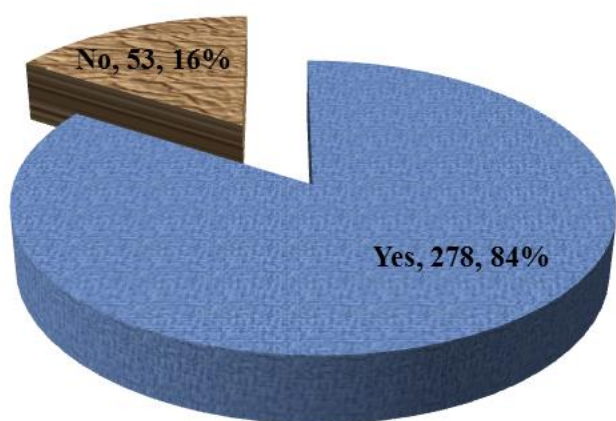


Figure 4: Respondents who treated their children at home

Results in Figure 4 show that majority of the respondents (84%) usually treated their children at home when they got malaria or never did anything to them. This means that mothers employed varied treatment options to treat their wards without going to the hospital or any health facilities. Meanwhile, 16% of them reported of going to the hospital/health facilities to have treatment for their children. On the types of drugs that they usually administered to their children at home in an attempt to treat them with malaria, Table 10 is a summary of their responses.

Types of drugs	Frequency	Percentage
Paracetamol	171	61.3
Amodiaquine	39	14.1
Herbal mixture	24	8.6
Lonart	20	7.0
ACT	13	4.8
Quinine	4	1.6
Others	7	2.6
Total	278	100.0

Table 10: Types of Malaria Drugs Administered to Children at Home (n=278)

As shown in Table 10, 171 (61.3%) of the respondents who reported treating their wards at home, revealed that they used paracetamol when treating them. Thirty-nine of them

representing 14.1% also reported using Amodiaquine, while 24 (8.6%) used herbal concoctions. The use of Lonart and Artemisinin-based Combination Therapy (ACT) were reported by 7% and 4.8% respectively among the respondents. However, the results further showed that only 4 (1.6%) used quinine to treat malaria among their children. In related development, the respondents were asked to indicate their sources of drugs for treating malaria in their children at home. The results are contained in Table 11.

Sources of drugs	Frequency	Percentage
Drug store	229	82.4
Left-over malaria drug	24	8.6
Family	9	3.2
Friends	6	2.2
Drug hawkers	2	0.7
Others	8	2.9
Total	278	100.0

Table 11: Sources of Malaria Drugs Administered to Children at Home (n=278)

Drug stores were the major source of malaria treatment drugs. This is because as many as 229 (82.4%) indicated that they bought drugs from these shops to treat their children's malaria. Twenty-four of them representing 8.6% also said they had left-over drugs that they usually used for their children, while few of them acquired drugs from friends and family members. Similarly, the respondents were asked to indicate whether they obtained treatment from other places for their children apart from their home treatment. The pie chart in Figure 5 summarises their responses.

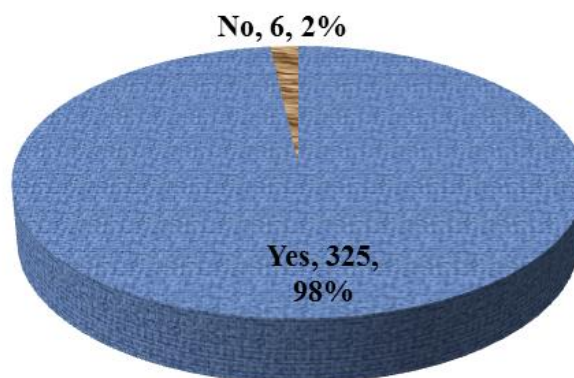


Figure 5: Treatment of child's malaria outside home

Out of the 331 respondents, as many as 325 (98%) reported of accessing treatment for their children from outside of their homes. This therefore means that although a good number of the mothers said they treated their children at home, they also sometimes accessed treatment from health facilities and other treatment centers. Table 12 showed those facilities from which they accessed treatment outside home.

Venues	Frequency	Percentage
Government health Centre	301	92.6
Private clinic	16	4.9
Traditional herbalist	3	0.9
Others	5	1.5
Total	325	100.0

Table 12: Places for Accessing Malarial Treatment outside Home (n=325)

Outside the home, majority of the respondents sent their children to government health centers for malaria treatment as indicated by 92.6% of them. Sixteen representing 4.9% said they visited private clinics, while 3 (0.9%) went to herbal centers for treatment of their children.

III. DISCUSSIONS OF RESULTS

LEVEL OF KNOWLEDGE OF MOTHERS ON MALARIA

The results that mothers' knowledge level being low on the causes, symptoms and prevention have been debated in literature with varied findings from researchers. For instance, in Ghana, Agyapong and Manderson (cited in Otchere, 2011) found that only 35.2% of the respondents correctly identified mosquito bite as the main cause of malaria. The remaining 64.8% did not know the main cause of malaria. However, this study found that as much as 84% of the respondents knowing that mosquitoes were the main cause of malaria among children despite the fact that they also added some other causes such as too much sun, malnutrition, dirty environment and flies. Unlike former, there appears to be a drift from superstition as respondents generally did not attribute malaria in children to witchcraft. The findings also disagree to findings of Agu, and Nwojiji, (2005) in Ebonyi State, South East Nigeria, where only 35.2% of the respondents correctly identified mosquito bite as the main cause of malaria. These could be due to differences in the places of the study and also the time of the study. A lot of education on malaria might have gone on from the time Agyapong and Manderson did their research and now.

Similar to this study finding, De La Cruz et al., (2006) found that knowledge level among respondents from the Central and Eastern regions of Ghana was extremely high as they identified mosquito bites as a main cause of malaria, with some adding additional causes. The knowledge of the causes was also reported to be relatively high in the Kassena-Nankana District in the Upper East Region of Ghana, where 65% of the respondents were able to link malaria to mosquito bites (Laar, Laar, and Dalinjong, 2013).

On mothers' knowledge about malaria symptoms, though on the average this study found that mothers have very low knowledge about the symptoms (32.9%) other researchers (e.g., Chibwana et al., 2009; Launiala & Honkasalo, 2010) concluded contrary that there was high knowledge on the symptoms like fever/ high fever, vomiting/nausea and feeling cold/chills/shivering/rigours. Other researchers mentioned body pain or aches and headache, loss of appetite, loss of consciousness, sweating and malaise as some of the symptoms of malaria. Meanwhile, with regard to fever, majority of the respondent (72.8%) agreed that is a symptom of malaria which agrees with the founding of the above researchers. Also Agyapong and Manderson (cited in Otchere, 2011) reviewed that respondents in Ghana use fever as a dominant term for malaria. In addition to this study finding, De La Cruz et al., (2006) found that nearly 70% of the respondents from the Central and Eastern regions of Ghana named fever as a symptom of malaria.

Knowledge on whether malaria could be prevented, 98% of the respondents believed that malaria among children could be prevented. This confirms the report given by Appiah-Dankwah and Badu-Nyarko (2011) that, more females know malaria as preventable disease. On knowledge of malaria preventive methods, a large majority of them (76.1%) were able to indicate that the use of insecticide treated net (ITN) was a way to prevent malaria among children. About insecticide spray 36.3% identify it as preventive method, 34.7% of them mentioned mosquito coils. This finding agrees with the Adeyeri, (2011), in Determinants of insecticide treated nets. Participants mentioned mosquito coil, insect repellents and indoor insecticide spray as method that can be used to prevent malaria. Bed net was recognised as the most potential method of preventing malaria as 82.5% of the respondents mentioned it (Adeyeri, 2011). Similar finding was reported by Zuradam, (2012) in 'Factors Associated with Use and Non-Use of Mosquito Nets for Children Less Than 5 Years of Age in the Mfantseman Municipality in Ghana' as 70% of the participants identified ITN as a method to avoid mosquito bite. The similarity could be due to the national malaria control programs that has been campaigning across the entire nation.

About the cleaning of their surroundings, a good number of them 139 (42.0%) said that this could prevent malaria, while most of them thought otherwise. Similar findings were observed by Appiah-Dankwah, and Badu-Nyarko, (2011) that, two-thirds of the respondents selected cleaning the environment as the best method for preventing malaria in the community. This similarity could be attributed to the national campaign on environmental sanitation since the two study were done in the same country. Additionally, Ayalew, (2010) reported that one of the protective methods identified by the respondent was environmental management (keeping surroundings clean) which was mentioned by 54.4% of the respondents but 8.6% of the household responded positively to the practice (Ayalew). Little was known about herb taking and avoiding of too much heat as preventive methods of malaria. On good nutritional practices as malaria prevention tool, 76 (23.0%) agreed, while a large majority (77.0%) did not believe this.

This also shows that respondents agreed to the use of vector control methods such as insecticide-treated bed nets (ITNs) and indoor residual spraying (IRS) as mentioned by Yadav, (2014). Similarly, the World Malaria Report, (2015) mentioned that the three primary prevention strategies commonly used are drug treatment, indoor residual spraying to eradicate mosquitoes, and mosquito nets to prevent bites. It is significant that 79.4% of the respondents with no formal education had adequate knowledge of the causes of malaria. Similarly, among those with JHS/Middle school level of education, 134 (84.3%) were found to have good understanding of the causes of the disease. All the 9 respondents with tertiary education had adequate knowledge of the cause of malaria. The test of association using the Chi-square test however showed that there was no significant association between the two variables similar result was reported by Appiah-Dankwah and Badu-Nyarko, (2011) in their study in Sub-Urban Community in Accra, Ghana. 2011. They noted that 63% of respondents with tertiary education

and 45% of respondents with no formal education knew malaria was caused by mosquito bite. This indicated that, educational levels might not directly affect one's knowledge about the causes of malaria. The researchers concluded that Knowledge in malaria prevention and control might not result from formal education only but other sources such as non-formal and informal education. Community members are educated on health issues through informal sources such as advertisement from drug manufacturers, radio and television programs and newspapers.

On the contrary, while this study found no significant association between knowledge on malaria preventive measures and respondents' educational levels, Appiah-Dankwah and Badu-Nyarko found significant relationship between formal educational levels and knowledge of the best method of preventing malaria in the community. This could be the differences in the communities. The peri-ulban communities in Accra may have more educated people that of the two districts which can contribute the finding.

STRATEGIES USED TO PROTECT CHILDREN FROM GETTING MALARIA

The findings from this study revealed that, the most preventive strategy used by the mothers in the selected communities was the use of ITN (43.5%), followed by mosquito coils (9.5%) and indoor spray (9.2%). This confirms the studies by Ayalew, (2010) and Nordblom, (2010). Yusuf, Dada-Adegbolab, Ajayia, & Faladeed, (2008). All these studies reported that the most malaria protective measures used by participants are ITN, mosquito coil and the indoor spray. The similarity could be attributed to the WHO initiative on preventive methods which emphasizes on the use of bed net as the best method to be used. Since all communities for these researches agree to the WHO initiatives.

The findings also follow the pattern of the participants' knowledge on the malaria preventive methods. Also Ayalew, (2010) on knowledge and practice of malaria prevention methods among residents of Arba Minch town and Arba Minch Zuria district, southern Ethiopia showed that (73.3%) of the households used mosquito nets in the last 12 months to protect one or more of the household members from mosquito bites. The second mostly used protective measures were insecticidal aerosols (13%). In this study, another method identified by the researcher was environmental management (keeping surroundings clean) which was mentioned by 54.4% of the respondents but 8.6% of the household responded positively to the practice (Ayalew).

On the contrary, only 144 (43.5%) of the respondents used ITN as strategy to protect their children against malaria the previous night. As against the 76.1% who mentioned ITN as a protective method, 36 (9.5%) spray and the 34 (9.3%) mosquito coil. As many as 101 (30.6%) of them said they never did anything to prevent their children from getting malaria. This confirms Zuradam, (2012) finding in which 70% of the respondents identified ITN as a protective method against mosquito bite but 22% out of them said children should not sleep under ITNs. Additionally, Adjah and Panayiotou, (2014) found that only 45% of their respondents used ITN to protect their children. There is therefore, evidence

that people's actions towards malaria prevention and control were not the result of their knowledge of the disease but that such knowledge is not transformed into desired actions. Similar finding was observed by Ageypong et al. (as cited by Appiah-Dankwah, & Badu-Nyarko, 2011), health education of malaria often fails to address the ethno-medical perceptions and socio-economic realities of the target audience and encouraged that these realities should be considered in every malaria education program. One of such socio-economic realities is the finding which reveals a gap between peoples' knowledge of malaria and desired actions or practices of its prevention and control.

ACTIONS TAKEN BY MOTHERS FOR MALARIA INFLICTED CHILDREN

The treatment seeking behaviour of the mothers is important as the signs of malaria in children are first recognised by mothers and they start treatment at home in the form of self-medication or 'first aid' with antimalarials and/or antipyretics Eckhardt, (2005) argued that home treatment is by far the first in the treatment seeking process, but these treatments given are not adequate owing to the fact that the main drug used to treat malaria was Paracetamol. Malik et al., (2006) found that most mothers started care at home and within an average of three days, shifted to health workers when the see no response. The findings from this study agree with the above that, mothers first give some form of treatment at home to their children when they are infected by malaria and later seek help outside home. The main medication that mothers give at home is paracetamol as mentioned by (61.3%) of the respondents. About 23, 8% of the respondents mentioned that they sponge their children when they get malaria. This also confirms the founding in treatment-seeking in Malawi by Munthali, (2005). The researcher reported that, home methods such as tepid sponging and purchasing of shop bought drugs such as aspirin were the most frequent first response for the treatment of malaria. This could be due to the participants' knowledge on the symptom of malaria. In all the above studies participants used fever for malaria and the main treatment for fever according to Crosta (2015), is antipyretics such as ibuprofen or acetaminophen (paracetamol). As many as 229 (82.4%) indicated that they bought drugs from drug stores to treat their children at home when they get malaria. This confirms the findings by Klein, Lewis, Jung, Llinás, and Levin, (2012) in Relationship between treatment-seeking behaviour and artemisinin drug quality in Ghana. The researchers reported that, 97% of the care givers listed the drug shop/medicine seller as one of their top three choices for seeking treatment. Mumuni and Rossi (2008), also reported that, drug purchased from pharmacy shops, drug stores, and drug peddlers or, modern health care facilities are some of the treatment seeking option in Ghana as well as other African countries.

This study also revealed that 98% of the respondents seek for care outside home and the place of choice is the health facility. This means though treatment starts at home the people still use the health facilities. This confirms the study by Maroon, (2010) who reported that, individuals were found to prioritise treatment from formal health facilities over

attendance at traditional healers, if the initial cause of action was perceived to have failed. Similar finding was reported by Chukwuocha et al., (2009) in the Treatment Seeking Behaviour of Mothers for Home Management of Malaria in Endemic Areas. The majority of mothers with febrile children visit a health facility. Additionally, Karunamoorthi, and Kumera, (2010), revealed that, the majority of the respondents preferred to seek treatment in the health facilities rather than approaching traditional healers. Contrary to this founding is the report by Klein, Lewis, Jung, Llinás, and Levin, (2012) where as many as 86% of the care givers listed traditional/herbal remedies as the preferred choice. Similar report was given by Mumuni and Rossi, (2008) in 'Perceptions of malaria and treatment seeking-behaviour'. They stated that, herbal treatment, either self-prepared at home or given by herbalists were the best choice for their respondents. The differences could be due to the differences in the study methods. Klein, Lewis, Jung, Llinás, and Levin used qualitative with 32 participants (Klein, Lewis, Jung, Llinás, and Levin, 2012), while the author did quantitative using questioners. These could affect the findings.

IV. SUMMARY, CONCLUSIONS AND RECOMMENDATIONS

SUMMARY

The study investigated the level of knowledge of mothers with children under-five years from two selected districts in the Central Region, and strategies that they employed when their children had malaria. A quantitative descriptive study was employed for the study and a structured questionnaire was developed for the respondents. The study attained a 99.4% retrieval rate since 331 of them responded out of the sample size of 333. The respondents were randomly selected for the study.

In analysing the data, the SPSS was used and both descriptive and inferential statistics were computed to address the research questions and hypotheses. Specifically, frequencies, percentages, graphs, and the exploratory factor analysis were used. The socio-demographic characteristics of the respondents showed that they were fairly old and married with children aged 1-3 years. The respondents were generally less educated and mainly petty traders with less than GH¢ 500 as their total monthly family income.

KEY FINDINGS

The following were the major findings that emerged from the study:

- ✓ Although as much as 99% of the respondents had heard about malaria, their knowledge level on the possible causes, symptoms and preventive measures dwindled drastically.
- ✓ About 84% knew that mosquitoes were primarily responsible for malaria among children, but also incorrectly accepted that too much sun, malnutrition, dirty environment, flies could also cause malaria. However, they were unanimous in their responses that chilled

climate and witchcraft were not causes of malaria in children.

- ✓ As much as 72.8% of the respondents identified fever as symptoms of malaria in children. Headaches and weakness were also named.
- ✓ Insecticide treated net, mosquito sprays and coils as well as cleaning of surroundings were the commonly known malaria preventive techniques among the respondents.
- ✓ Whilst 43.5% of the respondents used treated mosquito nets, good nutrition and cleaning of environment (9.5%) and mosquito coils (9.2%) to prevent malaria over the previous night, a substantial proportion of them (30.6%) did not do anything in this regard.
- ✓ About 43% of the respondents reported of rushing their children to the hospital/health centres where they are sick by malaria. However, some administer 'first aids' such as giving them paracetamol and sponging them first before either going to a health facility or treating them at home entirely. The most common treatment drugs were paracetamol (61.3%) and Amodiaquine (14.1%) bought from drug stores.
- ✓ Government health centres (95%) were the main treatment avenues for mothers who accessed malaria treatment outside home for their children.

CONCLUSIONS

The findings clearly pointed out that, many people have heard about malaria, and know the causes, symptoms and preventive measures of malaria in children even though their knowledge is compounded with erroneous perspectives.

Formal education does not contribute to one's knowledge of malaria, since there was no significant association between mother's educational level and their knowledge of malaria.

Vector control method is the method the mothers are familiar with. The study found out that, the common protective method the mothers use is the ITN, mosquito coil and mosquito spray. Although a lot of mothers do not use anything to protect their children.

Mothers start malaria treatment at home but seek help at the health facility when the condition does not stop.

RECOMMENDATIONS

The following recommendations were made for practice, policy and further research:

RECOMMENDATION FOR PRACTICE

- ✓ The knowledge of the respondents was generally low so education should be intensified in these studied districts to sensitise them on the causes, signs and symptoms, prevention and treatment of malaria in children.
- ✓ Mothers should be encouraged to take steps to prevent malaria since the saying goes that "prevention is better than cure." They should use the insecticides treated nets (ITNs) in particular and use mosquito sprays and coils advisedly because their children are not mature enough.

- ✓ Mothers should employ 'first aid' treatment of malaria in their children before taking them to a health centre. These include giving of paracetamol and sponging.
- ✓ It is not medically advisable for mothers to treat their children at home by relying on "unprescribed" drugs. Therefore, they should be encouraged to always seek professional attention just after administering 'first aid'.
- ✓ There should be a regular cleaning of surroundings to prevent the breeding of mosquitoes, which are responsible for malaria in both children and adults.

RECOMMENDATIONS FOR POLICY

- ✓ Ministry of Health (MoH) and Ghana Health Service (GHS) should adopt more effective malaria education campaign strategies especially in the study areas. Due to the low educational status of the respondents, simple but effective education strategies should be used for the desired impact.
- ✓ Ministry of Health (MoH), Ghana Health Service (GHS) and other relevant stakeholders like Zoomlion Company Limited should consider fumigating these districts to save children in particular from malaria disease.
- ✓ The National Sanitation Day (NSD) introduced by the Ministry of Local Government and Rural Development should be fully implemented and operationalised by the respective district assemblies

LIMITATIONS

The study was limited to only women with children of age five years and below in the Central Region. Due to time and financial constraints and the large nature of the Region, the study did not cover every community in the district. In view of that, data for the study was collected from subjects chosen from two selected districts in the Region. The study would have been a better representation of the region if more than two districts were used. In addition, the researcher did not take into consideration the differences in population among the two districts selected. Because of that the researcher could not find the relationship between the districts and their preventive methods. Misinterpretation; most of the respondents could not read and interpreted the questions themselves. This was done by the researcher and the assistance could lead to misinterpretation of both the questions and their responses which can affect the result.

SUGGESTIONS FOR FUTURE RESEARCH

- ✓ Trend analysis of malaria cases among children in selected district in the Central Region.
 - ✓ Estimating the social and economic costs of malaria treatment in children.
 - ✓ Identifying the socio-demographic determinant of mothers' knowledge on malaria.
 - ✓ Assessing the effectiveness of malaria prevention strategies employed by mothers in the selected districts.
- Assessment of the availability of malaria treatment facilities for children in the selected districts.

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