

PREVENTION OF MALARIA IN DORMAA MUNICIPALITY OF GHANA

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ABSTRACT <p>Malaria continues to be a greater cause of morbidity and mortality in Ghana. The government of Ghana and other donor agencies are making tremendous efforts to prevent and control the disease. In spite of these efforts by the government, malaria has not yet been defeated in its bastion.</p> <p>The aim of the study was to find out the experiences community nurses have about the existing methods of preventing malaria and the challenges facing them in their effort to prevent the disease in Dormaa municipality.</p> <p>Qualitative research was used to find out the preferred methods in the community. Also the study investigated the various misconceptions the people have about the preventive methods and the challenges nurses encounter. 18 community nurses from all the health posts in the municipality were interviewed through semi-structured questionnaires.</p> <p>The study revealed that repellants and ITNs were the most preferred methods used to prevent malaria in Dormaa. Residents have various misconceptions about these preventive methods. It also came out that lack of funds and inadequate personal restrain the activities of nurses in their efforts to promote health in the area.</p>		
Keywords Malaria, prevention, methods, challenges, misconception		



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1 INTRODUCTION

Malaria is a major cause of morbidity and mortality in the world. Malaria poses a greater threat to about 40% the population of the world, particularly pregnant women and children under the age of five. In year 2010, there was an estimation of almost 220 million cases of malaria and 660,000 deaths respectively. Sub-Saharan Africa is the region mainly affected with about 85% of these cases occurring in that region (Abora, et. al. 2013.) According to WHO (2013), malaria kills 1300 children in a day and one child every minute globally. Malaria is pandemic throughout the tropical regions in the world. It is considered to be one of the killer diseases in sub-Sahara Africa. It was estimated that 300 million cases of malaria was recorded on the globe annually (Dugbartey & Apedo, 1998.) The world needs 3 billion dollars to combat malaria every year (UNICEF, 2012).

The 2010 report from 106 malaria endemic countries indicates that the cost of funding for the control of this disease was 1.5 billion dollars in only 2009. This seriously threatens the 2015 global target, since the report further indicates that fund inflow remained at 1.8 billion dollars as against over 6 billion dollars required within the period mentioned (WHO, 2010). Malaria kills over a million people every year globally with 90 percent of the deaths coming from Africa. Children under five years also constitute 70 percent of this number. In sub-Saharan Africa, one in five children death is the result of malaria (Molavi, 2003.)

In Ghana, malaria has rendered many people mentally handicap and psychiatric morbidity (Dugbartey & Apedo, 1998). Malaria has caused a section of the population into poverty and this situation has reduced national output, hence slowing down national development. Despite the fact that several attempts have been made over the years to combat the disease in

Ghana, statistics for 2010 indicated that an average of 8200 cases were reported daily, and a total of 3 million cases for a whole year. Out of this figure, over 3000 deaths were recorded. The most vulnerable population was children and pregnant women (Tettey, 2011).

Malaria is the leading killer disease in Ghana. In 2008 Ministry of Health (MOH) budgeted 846,142,000 dollars for malaria. It is estimated that malaria accounts for 33% of death in children under five year old and 36% of all hospital admission sickness in the country (Ghanaweb, 2012.) Every year 3.5 million people are infected with malaria and approximately 20,000 people also die from malaria of which most of them are children under five years of age. Most of the children who are able to survive from malaria suffer from convulsion and brain disorders, which affect their growth and development. In 2008 the cost of malaria was 760 million dollars and that was 10% of the country's gross domestic product. Upon this entire devastating situation little attention has been given to research in this area of study (Tweneboa-Kodua, Otuo & Mahama 2012.)

The incidence rate of Malaria in Dormaa Municipality of Ghana continues to increase. Available records at the Ministry of Health for Dormaa Municipality shows annual malaria incidence increasing from year 2005 to 2007. In year 2005, Out Patient Department (OPD) cases diagnosed, as malaria was 51,163. This figure rose to 66,833 and 93,216 in year 2006 and 2007 respectively. In year 2008 however, the figure dropped from 93,216 recorded the previous year to 88,381 (Majoros, 2011.) These figures show that malaria is still a major threat to the population of Dormaa and Ghana in general. The aim of the study is to find out the experiences community nurses have about the existing methods of preventing malaria.

2 MALARIA

Malaria is a life threatening disease that is transmitted by mosquitos. One can be infected when there is a mosquito bite. Mostly the female mosquitoes, which are known as anopheles, are the main transmitter of the disease.

Malaria is tropical disease, which is more prominent in the tropical regions of the globe. It can be diagnosed when infected person experiences the following signs and symptoms; fever, headache, weakness, chills, dizziness, abdominal pain, diarrhea, nausea and vomiting (NHS 2014). In laboratory there are many techniques such as microscopic diagnosis by staining thin and thick peripheral blood smears, concentration techniques and other are used (Parasitol, 2009).

Research has shown that single cell causative organism of malaria is “Plasmodium”, which lives in mosquitoes. The female mosquitoes, which are known as anopheles, are the main transmitter of this organism. It is probably one of the oldest parasites known. There is less knowledge about the evolution of this Plasmodium, but it is estimated that the organism was developed about a million years ago. It is believe that it had been grown up in the inner intestine of reptiles. There are four kinds of the plasmodium, which cause the malaria in humans. These are: Plasmodium falciparum, Plasmodium malariae, Plasmodium ovale and Plasmodium vivax (Giger, 1999.)

2.1 People Perception and knowledge of malaria

A quantitative research in Brong Ahafo and Upper East region of Ghana revealed that the people have little or no trust in health providers. This is due to the fact that the people have different view about malaria and such divergent view is a deterrent to prevention of the disease (Hoop & Kempen, 2010.) For example, in another study in the Northern Region of Ghana the

people said they know a lot about malaria and complied with whatever the health workers say. But when their children are sick and they send them to hospital the disease is diagnosed as malaria. As a result of this they have little confidence or no trust in the health workers because they believe they did everything the health workers asked them to do in order to prevent the disease yet their children continue to suffer from malaria. They believe the use of Insecticide Treated Nets (ITNs), for instance, to prevent malaria is useless. (Adongo, Kirkwood & Kendall, 2005). In another studies the people have misconception that malaria cannot be avoided because they were born with it and they will die it. Even if it is treated, it will come back (Ahorlu, Dunyo, Afari, Koram & Nkrumah, 1997.)

According to Tweneboah-Kodua et. al (2012), many studies conducted on the knowledge, mind-sets and views of people in the malaria prone communities indicates that the people who plan and implement the preventive programmes do not usually put the perceptions of the people (residents) into consideration. For instance, Tesfa (2012) study in South Western Ethiopia revealed that although health workers made ITNs available to households, the residents refused to use them because of the beliefs that they felt breathless, stressed and uncomfortable whiles sleeping under the nets. The health workers' activities primarily focus on the ITNs distribution instead of letting the people to understand how vulnerable they are to malaria. As a result, the people get the ITNs but use them for different purposes such as fishing nets. The government and other agencies are doing a lot to promote the prevention of the disease but the outcomes are marginal due to improper approach of communication. The studies stressed on the need for the institutions to focus on the culture and beliefs of the community, since some of the cultural beliefs are major setbacks in malaria prevention programmes (Tweneboah-Kodua et al, 2012.)

2.2 Government and non-governmental interventions

Ministry of health (MOH) has drawn a comprehensive plan between year 2000 and 2010 to ensure that Ghana minimize diseases cases by 75% by the year 2015 in order to achieve the Millennium Development Goal. Under this programme, there should be one ITN in every household and 80% of the entire population should sleep under ITN as well as 85% of children less than five years and pregnant mothers (MOH 2009).

Again, in year 2005 the United States government announced six years Global health initiative to bring down malaria trouble and other diseases such as HIV/AIDS and tuberculosis. That was to encourage healthy communities and families worldwide, which Ghana was not an exception. The amount that would be spent within this period was 63 billion dollars and the attention was mainly on women, newborn babies and children. Under this initiative malaria mortality should be reduced by half in 15 sub-Saharan countries including Ghana by 2014. Ghana embarked on full implementation of the program in early 2008 in conjunction with National Malaria Control Program and other non- governmental agencies. In 2011 they were able to obtained 1.9 million ITNs, which were distributed freely through antenatal and immunization clinics to the people who are vulnerable, (USAID 2011). Newmont Limited, for instance, distributed 2500 ITNs to the Abirim North communities (GNA 2012).

2.3 Malaria Health promotion

The first lady of Ghana Miss Lordina Mahama launched a campaign in 2013 to help in fighting against malaria with support from Johns Hopkins, Volta River Authority and Volta River Estates Limited. Under this initiatives people are sensitize on the misconception about ITNs and encourage them to sleep under the net and try to use the Rapid Diagnose Test. The free distribution of the ITNs will be in progress more especially to primary school children. A new

mobile device called Counterfeit Detective Device (CD-3) will be intruded to help deal with fake malaria drugs in the system, (GBC 2013).

A study has shown that the majority of the people receive malaria sensitization and health promotion on radio, TV, poster than any other media. In 2003, the quantitative research conducted by Ghana Demographic and Health Survey (GDHS) indicated that 88% of urban population and 80.3% of rural population get the message on radio. TV was 71.5% in the urban areas and 32.3% in the rural areas while the health workers was 41.2% in both areas. Poster accounted for 51.4% and 33.1% in both areas respectively (Ghana Statistical Service, 2004.)

In 2010 Ghana football association and Ghana local leagues club in collaboration with United Against Malaria (UAM) embarked on campaign to create awareness of malaria and how the disease can be prevented by using posters, billboards advert on TV and t-shirts of star football players such as Michael Essien, Stephen Appiah and others, which contain messages campaigning against malaria. It is a fact that football is one the leading platform of which one can send information quickly in Ghana. The district malaria advocacy team also carries these messages to the grassroots levels. The most popular football players in Africa such as Samuel Eto'o of Cameroon, Didier Drogba of Cote d'Ivoire and Seydou Keita of Mali have been used in other African countries for similar exercise (UAM, 2010).

In the Dangme East District of Greater Accra region of Ghana another study was conducted with school children. The pupils were taught ways of preventing malaria with the use of the leaflet, posters and drama. They were asked to send the information to their various communities, which proved very effective. The research reviewed that students are one of the best ambassadors in prevention of the disease (Ayi, Nonaka, Hanafusa, Jimba,

Bosompem Mizuoe, Takeuchi, Boakye & Kobayashi, 2010.) In Thailand the students use a similar approach and the communities were sensitized about malaria and its prevention (Okabayashi, Thongthien, Singhasvanon, Waikagul, Looareesuwan, Jimba, Kano, Kojima, Takeuchi, Kobayashi & Tateno, 2006.) Also in Kenya another study shows that the pupils have more abilities in creating awareness and prevention of malaria in the rural communities, (Onyango-Ouma, Aagaard-Hansen & Jensen, 2005.)

3 COMMON EXISTING METHODS OF PREVENTING MALARIA

3.1 Insecticides Treated Net (ITN)

The commonest and trusted of these methods seems to be the use of Insecticides Treated Net (ITN) (Lengler, 2009, p. 3). Research in some Sub-Saharan African countries has proven that although the use of ITN has been commonest and effective method of preventing malaria, but its ownership and utilization by the populace have always been the problem (Hart & Tobin-West 2011, P. 136). The authors particularly noted that the situation is partly due to the fact that the nets are always distributed free of charge only during antenatal care and also during immunization of children in house-to-house bases. It therefore make availability to every individual a questionable matter in the sense that not all individuals attend antenatal care neither do all individuals receive immunization. Thus those who fall outside these two categories and cannot afford are relegated to the background. Also, some individuals own the nets but do not actually use them (ITNs) under the excuse that the net compound the already hot condition the people face in tropical climate in Sub-Saharan African countries. In other words the net prevent them from enjoying fresh air.

Another related studies conducted in Uganda shows that ITN is very helpful for pregnant mothers and children in the sense that it drastically reduce the occurrences of malaria. The authors also made mention of the fact that there is low patronage by the people due the high temperatures and humidity. There was also high cost of ITN. Another factor also is the misconception of the people. They believe that the chemical used to treat the net can have negative effects on their health. The adolescents' were ignored with notion that they are resistant to malaria. This is more especially during the antenatal and delivery care. There was poor communication between the health worker and the community and also improper care given to them, therefore they were not motivated to use ITN. It is therefore very important to emphasis more

education and awareness about malaria and its havoc course to the community as whole by the health workers and other agencies because everybody is at risk and also malaria is life treating (Anthony, Stella & Pascal, 2005, pp. 4-5.)

Similar studies conducted in the 41 malaria endemic villages at north-west Burkina Faso shows that malaria cases for children less than 5 years has reduced 23% between 1999 and 2009 as result of increase in the household use of ITN. Despite this achievement the, malaria incidence and morbidity remain in ascendancy especially the older children. This attributes the different sleeping behavior among children and adults. Again during the dry season most people don't sleep in the net. Cultural and behavioral changes also affect the use of ITN. The researchers concluded that individual use of ITN as prevention of malaria is not enough to fight against the diseases in high endemic regions. Achieving general coverage of ITN is still a great challenge. (Louis, Bals, ogo, Bountogo, Ramroth, Allegri, Traore, Beiersmann, Coulibaly, Ye, Jahn, Becher & Muller, 2012.)

3.2 Repellents

Apart from ITNs, there are other repellents that are used to prevent mosquito bites and the spread of malaria. These repellents consist of various devices that emit vapor or droplets into the air. Example of such repellents is the mosquito coil. Other repellents are topical creams that are applied directly to the skin, which prevents the mosquito from biting an individual. (Strickman, et al., 2009).

Kiszewski & Darling (2010) hypothetically state how a bite protection leads to disease protection. They formulated a hypothetical equation and according to their equation, a repellent that prevents about 98% of bites and is used by

98% of the people reduces the incidence of malaria by 88.9% during a 7-month transmission season where 1.5% of mosquitoes are infected and an individual receives an average of 40 bites per night.

Del Cielo, a private enterprise that promotes the use of repellents to prevent malaria distributed its product, 'NO MAS' in the Kassena Nankana District of Ghana. According to them, 97% of the people used the product and investigations proved that 90% bites were protected. According to them, going by Kiszewski and Darling's equation, 1.87% of the residents would be infected with malaria per night if they failed to use 'NO MAS' as compared to only 0.25% infected if they used the product. Repellents such as creams and coils have significantly reduced the incidence of malaria in Africa and Ghana in particular but unfortunately, they have never been able to eliminate all malaria transmissions. Although they have not been successful in eradicating malaria completely, future research and project developments will definitely improve their efficacy by selecting and combining more potent chemicals that prevent the spread of the disease (Strickman et al., 2009.)

3.3 Anti-malaria drugs

Anti-malaria drugs significantly help in the control of malaria in endemic areas. These drugs are used to prevent and to treat malaria. The use of anti-malaria drugs to prevent the spread of malaria focuses mainly in endemic areas such as Africa and Southern parts of Asia. Vaccines that provide immunity against malaria will help prevent the disease and parasite transmission. These vaccines will immensely prevent or reduce morbidity and mortality associated with malaria when administered to infants, children and all other groups at risk. Hoffman, et. al., (2010) explain that researches have proven beyond doubt that immunization of humans by the bites of irradiated mosquitoes infected with *P. falciparum* sporozoites provides the principle that it is possible to immunologically protect humans against the disease, and for that matter,

provide a standard for malaria vaccine efficacy. Initially, it was however; thought to be impossible to manufacture and administer greater quantities of purified, aseptic, stable *P. falciparum* sporozoites that met regulatory and cost of goods requirements. Luckily, Sanaria, a biotechnology was founded with the primary aim of overcoming any obstacle by developing and commercializing a metabolically active non-replicating *P. falciparum* sporozoite (PfSPZ) vaccine. This vaccine is proven to be highly protective in humans and the main target population is children in sub-Saharan Africa.

Expatriates or travelers to highly endemic areas of West and Central Africa, for instance, have used anti-malaria prophylactics for many years. The use of these medicines such as quinine has prevented travellers' morbidity and mortality. Recently, visitors to these endemic areas are using other chemoprophylaxis and these medicines have proven to be effective in protecting these visitors. Many people have questioned why the same approach is not being used to protect local residents in these endemic regions (Hoffman et. al., 2010.)

Greenwood (2010) explains that chemoprophylaxis such as Chloroquine was widely used in these areas since it was recommended by WHO as effective medicine in preventing malaria, especially among pregnant women. Unfortunately, the use of Chloroquine was stopped because of side effects and increasing resistance to the medicine. Apart from chloroquine other chemoprophylaxis have also been tried among children and proved to be effective by decreasing deaths from malaria, preventing attacks of malaria, and reducing prevalence of anaemia. Although the medicines that were tried demonstrated the efficacy of these chemoprophylaxis in preventing mortality and morbidity from malaria, widespread used was not successful because of the following problems: 1. Cost- that is the purchase and distribution of prophylactic medicines to entire population is very expensive for governments of such poor countries so preference were given to only the high risk groups

such as pregnant women. 2. *Sustainability*- sustainability was a challenge for the long-term administration of the prophylaxis since both the deliverers and receivers lost interest in the program. 3. *Acceptability*- Chloroquine, for instance, has a bitter taste and causes itching after taking so many people rejected it. 4. *Drug Resistance*- widespread use of the drugs increases drug pressure and enhances spread of resistance parasites. 5. *Loss of immunity*- exposure of prophylaxis to infants hampers the development of natural immunity and this therefore makes them susceptible to the disease when the usage of the medicine is stopped.

Apart from chemoprophylaxis, Intermittent Preventive Treatment (IPT) is another chemo preventive method used to reduce the effect of malaria and this is achieved through giving a full curative dose of an anti-malaria at specific periods regardless of whether or not an individual is known to be infected. Studies conducted in Ghana, for instance, have shown that IPT is a highly effective intervention that reduces clinical attacks of malaria by 70% - 90% (Greenwood, 2010). MOH (2009) reports that apart from ITNs, IPT is the most preferred choice in dealing with malaria among pregnant women. These are combination of drugs given at predefined intervals with the aim of reducing parasitaemia and problems associated with pregnancy. Under the supervision of a health worker, which is known as Directly Observed Therapy (DOT), the IPT is given as a part of a comprehensive antenatal package with other drugs. For example, Sulphadoxine (500mg) and Pyrimethamine (25mg) were to be given as IPT under the DOT.

The effective use of anti-malaria drugs will reduce the rate of spread of malaria and ultimately reduce death rate from the disease. It will also prevent the long-term duration that an infected person stays with the disease. For these, among other reasons, coupled with the fact that malaria was becoming resistant to chloroquine, the government of Ghana, in year 2004 issued new guidelines for health practitioners as it prepared for a big increase in health

spending. The government decided to spend on expensive but more effective drugs in treating malaria in the country. It decided to allocate an estimated amount of US \$6million on national budget for new and effective drugs used in treating malaria. Every year, close to a quarter of Ghana's population seek medical treatment for malaria. Malaria had become resistant to chloroquine, which was the main drug to treat the disease partly due to unregulated prescription and inappropriate use. Officials therefore decided to switch to the use of more expensive but effective *artesunate-amodiaquine* as the first line of treatment. This meant the treatment of a single case of malaria would cost US \$1.30 as compare to the old cost of 10 US cents (IRIN, 2014).

Artesunate amodiaquine actually became the main and effective drug to treat malaria in Ghana after WHO recommended that malaria-endemic countries used Artemisinin-based Combination Therapies (ACTs) because of widespread resistance to chloroquine and other mono-therapies. Artesunate-Amodiaquine therefore became the first drug of choice to treat uncomplicated malaria. The introduction of this drug met some challenges because of the following reasons; first, there was the belief that some patients react badly to the drug and secondly, there were no alternative drugs. Moreover, there were some negative press report about serious side effects of the drug and this nearly prevented public acceptance of the drug. In order to arouse public confidence in the drug, the National Malaria Control Programme in collaboration with Noguchi Memorial Institute for Medical Research conducted a research and found out that treatment of malaria and the rate of reduction of parasites by chloroquine were very low whereas a comparative study on ACTs showed its efficacy with no serious side effects. On the issue of alternative to Artesunate-Amodiaquine, Two additional ACTs; Artemether-Lumefantrine and Dihydroartemisinin-Piperaquine were selected. Despite the selection and introduction of these alternatives, Artesunate-Amodiaquine still remains the most preferred drug in treating uncomplicated malaria in Ghana and has over 90% potency of treating the disease within 28 days (MOH, 2009).

3.4 Human resource and financial constraints in malaria prevention

Over 3 million new cases of malaria occur annually in Ghana. This situation therefore demands continual attention from more health workers to treat the disease. However, the human resources available to deal with the situation is very scarce. In Ghana, both internal and international migration, has affected the health care delivery. Internationally, nurses migrate to more developed countries whilst internally, nurses migrate from rural areas to urban areas due to the challenges of living in rural areas of Ghana. The distribution of nurses in Ghana always favours the urban areas (Crommett, 2008.) Ghanaweb (2008) quotes former director of Ghana Health Services, Professor Agyeman Badu Akosa, as saying that the greatest challenge in the Ghanaian Health sector is probably human resource deficit, which cuts across all health sector workers. According to Professor Akosa, the human resource deficit is compounded by maldistribution, which has seen greater percentage of health workers operating in major cities. Austrian Red Cross (2009) asserts that in 2008, Ghana had about half of the nursing population it had in the 1980s whereas its total population had doubled the figure it was in the 1980s. One of the main reasons for the decrease in nursing population was emigration. About 328 nurses emigrated from Ghana in only year 1999 and this situation means nurse-patient ratio has increased. This situation has caused much stress on the healthcare system.

Ghana continues to suffer from a shortage of health workers as well as inequities in both the distribution and skills of workers. Ghana has about 11 doctors, nurses and midwives per 10,000 population. This figure is less than half the number (23 per 10,000) which WHO deems necessary for achievement of the health MDGs. This shortage of health care workers and inequality in the distribution of these workers has negatively affected the achievements of national health objectives (ACCA, 2013.)

The Government of Ghana has decided to reduce malaria, HIV/AIDS and other communicable disease by the year 2015. This has been a focal point of the Millennium Development Goals that seeks to integrate primary health goals into community health care. Under this programme, the government decided to make quality health care more accessible to the rural poor. However, it has been observed that despite the fact that the policy seeks to focus on primary health care, most of the increased spending in the health sector has gone into different sectors and has neglected the primary health component (Public Agenda, 2008).

4 AIM AND PURPOSE OF THE STUDY

The aim of the study was to find out the experiences community nurses have about residents' knowledge of the existing methods of preventing malaria. The study was also to find out the challenges in controlling malaria within the Dormaa municipality of Ghana. The purpose of the study was to provide vital information for policy makers and health practitioners so that they can formulate sustainable strategies for dealing with malaria and its related problems in the municipality. The following questions were explored from the perspectives of the community nurses:

Which preventive methods of malaria the inhabitants of Dormaa prefer and why?

What are the perceptions of the inhabitants of Dormaa about the various methods of preventing malaria?

What are the challenges facing the nurses in their efforts to prevent malaria in Dormaa Municipality?

5 RESEARCH METHODOLOGY

Qualitative research typically studies a relatively small number of individuals or situations and preserves the individuality of each of these in their analyses, rather than collecting data from large samples and aggregating the data across individuals or situations. Thus, they are able to understand how events, actions, and meanings are shaped by the unique circumstances in which these occur (Maxwell, 2008.)

Qualitative research is the means to find out ideas, which encompasses element of verbal description of physical appearance, issues and setting. Again interviews, observation and analysis of documents as source of data can also be used (Meurer, Frederiksen, Majersik, Zhang, Sandretto & Scott, 2007.) It is also a logical and orderly exploration for facts on specific matters or issues (Kothari 2004, 1). The study was conducted in qualitative approach because the aim was to the get the 'general views of the subject under investigation', as stated by Doody & Noonan (2013).

5.1 Setting

The research was conducted at Dormaa municipality in Brong Ahafo Region, Ghana. Dormaa is semi urban community in Ghana with about population of about 159,000 living in about 154 towns and villages. Dormaa Ahenkro is the capital of the municipality. The main occupation in the community is farming. The current survey indicates that health takes the biggest part of individual household's expenditure. According to the survey an average household spend about 15% of the total expenditure on health (Ghanadistrict, 2006). The municipality was selected because malaria is the major reported case in the municipal hospital and clinics in the communities. For the purpose this research data will be collected from only Dormaa Ahenkoro, the municipal capital.

5.2 Sampling

18 community health nurses from all the 11 centers in the municipality were purposefully sampled for the interview, which took an average of 20 minutes. Purposive Sampling is a non-probability sampling technique that relies on the judgment of the researcher when it comes to the selection of units for sampling. The goal of this sample is to select characteristics of the population that will best provide best answers to the researcher's questions. Purposive sampling allows the use of multiple phases of sampling design with each building upon the previous one. For example, a Critical Case Sampling, which determines whether a phenomenon is worth investigating, could be used before applying Expert Sample approach (Laerd Dissertation, 2012.) Purposive sampling was used for this research because it enabled the researcher to select the nurses within the population who were in the best position to provide the needed answers to the research questions. Critical Case Sample was initially used to explore the participants (health care workers) required to answer the questionnaires before Expert Sample was finally used to select the community health nurses who are the key actors in the implementation of malaria preventive methods and thus have the requisite knowledge and experience that permitted them to provide answers to the research questions.

The sampled nurses were those with a minimum of one year working experience and at different towns or villages. All the participants were given prior information before the interviews were conducted. A letter was sent to the district health director in order for us to get permission to interview of the nurses. In the case of the nurses request letters were sent to the hospital/clinic authorities to seek their consent. Also similar request letters were sent to the individual participants (the nurses) as can be seen from appendix

5.3 Data collection

The research was conducted in qualitative approaches. A qualitative researcher is expected to communicate with people in order to get their experiences and perceptions about the issue under consideration (Patton, 2002, pp. 4-5). In qualitative research the researcher is expected to solicit people's opinion in order to produce solid facts. Here opinions are drawn from a section of the people who are representatives of a larger group of people population (Willis, 2009.)

Semi-structured interviews were conducted because of its numerous advantages. Barribal & While (1994) for instance, say semi-structured interview is the best way of finding views or discernment of the interviewer on composite and delicate matters helps to seek further information in order to get clear understanding of those issues. It also give room to focus on the main the main ideals and for the classification of the questions. Bernard (2006) also asserts that semi-structured interview allows the respondents to express themselves freely in their own terms whiles answering the questions along an interview guide provided by the interviewer. The interview guide makes the final data, reliable, comparable and qualitative. All the interviews were recorded and notes were also taken along side. The researchers were neutral and also made sure that the questions were well clarified to the respondents. According to Patton (2002, p. 5), a good interview goes beyond just asking questions. The researchers therefore took notes on the respondents' facial expressions and emotions as they respond to the questions.

5.4 Data analysis

A well-thought-out data tracking, processing, and management system enables the timely identification and resolution of problems, allowing researchers to focus more on interpreting, retrieving, and comparing data (Miles & Huberman 1994, LeCompte & Schensul 1999, McLellan, Macqueen & Neidig, 2003.) The qualitative data was analyzed through content analysis. The recoded interviews were transcribed and then printed. The transcribed data were forty seven (47) pages with font size of 12 and 1.5 spacing. The researcher read the transcribed interview thoroughly in order to get more familiarized with the text and then took note of emerging themes. The text was reduced into themes. Similar themes were further grouped into codes as show in below chart

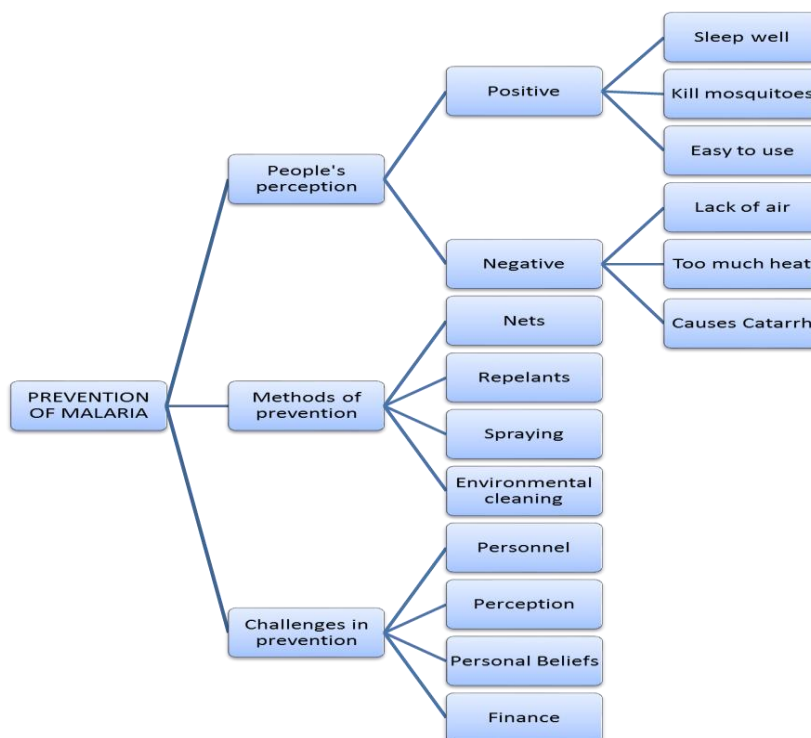


Figure 1. Mind Map of the Results

6 FINDINGS

This chapter presents the findings interviews conducted. The findings indicate that the people in the Dormaa Municipality have much knowledge about the most of the methods use in malaria prevention. According to the participants the most common methods were INTs, coils, insecticide spray and clearing of environment.

6.1 The most preferred methods of preventing malaria

The choice of a particular method depends on the individual preference and experience. However, repellants such as spray and coil emerged as the most preferable for method preventing malaria. The details of the various methods used by the people are presented below.

The participants perceived insecticide sprays and coils as the most preferred method. According to all the respondents, most people choose this method because the sprays are very easy to apply and also kills some other disturbing insects. Some of the sprays mentioned were *'raid'*, *'sasso'* and *'heaven'* mosquitos spray. The nurses said most people in the area say they like mosquito spray because it kills all the mosquitoes and other insects. Besides, it has a good smell. In spite of the perceived potent efficacy of the spray, the nurses said most residents complain that mosquito sprays are quite expensive and that they cannot easily afford it frequent use. Residents perceive it to be the best but they can only buy it when they have money.

A section of the community also uses mosquito coils, which also kills all the mosquitos in the room. The nurses explained that most of the residents prefer the coil to the spray because it is more economical as compared to spray and

it also has a good scent. The most common mosquito coils used are raid, sasso and heaven.

ITN is considered to be the second most preferred method they use after the repellants. The participants opined that it is the safest and most reliable because apart from preventing the mosquitos from having a direct contact with the person, it also kills most of the mosquitos by just contact. According to one nurse, a section of the people say they like ITNs because it is free of charge and 'no mosquitoes can come inside. Besides, some of the mosquitoes that get into contact with the net are killed instantly. According to the nurses, some people prefer the use of the net because when it is hanged or fixed around the bed there is no need to for one to wait outside the room for sometime as compared to spray and coils.

Despite the benefits of the ITN, the nurses said residents complain that nets are only effective when one is in it but unfortunately, no one can be in it for 24 hours. It is easy to use and again free of charge from the health workers. Every household in my community has the net. On the contrary, one participant stated that ITNs is not very reliable as most people regard it. This is because you are only safe from mosquito bite when you are in the net and it is not possible to be in the next 24 hours.

6.2 Perceptions of the people about the preventive methods

On the question of how residents perceive the various methods of malaria prevention, respondents explained that majority of the residents believe that the preventive measures are effective in protecting them against malaria. For this reason, they have accepted and are using these methods to fight against the disease. For example, the use of repellents such as coils and sprays, as stated earlier, is very common among residents. This notwithstanding, there

are other individuals who have misconceptions about these methods of prevention. Some of them believe that some of the methods are not really effective in preventing malaria whereas others, who actually believe in the efficacy of these methods, believe that the use of these methods bring adverse effects on their health.

Some residents do not believe that bushy surroundings, filth and stagnant waters are breeding grounds for mosquitoes. Some of them also believe that mosquito coils and sprays expose them to cold or catarrh. Interestingly, of all the various methods of prevention, ITNs are the only method of prevention that is given to residents at no cost, yet they hardly use them. According to the nurses, residents perceive the ITNs as something that produces heat and exposes them to heat rushes. Some also complain of not receiving enough air when sleeping in the net. Again, some think the chemical used to treat the net has negative effect on their health. Strangely, the nurses said there are others who complain that they feel like dead bodies when sleeping in the nets.

6.3 Challenges in preventing malaria

There are numerous challenges that hamper the effective prevention of malaria in the Dormaa Municipality, according to participants. The survey revealed that there were inadequate personnel who could go to the doorsteps of the people and educate them. As a result they were unable to complete the given task within the month.

"we are supposed to go for malaria education in all the villages in my area (at least once in a week) and we are only three nurses at the station. Always there should be one of us at the station. Sometimes there are some areas that we cannot visit during the month of immunization".

Lack of sufficient funds is also another challenge. According to the nurses, almost all the money used for these activities is given by the government and donor agencies, which do not come regularly.

“we need vehicles and motorbikes to go to the remote areas but these resources are not available and this makes it difficult for us to go to these areas. Our only motorbike in my station broke down last month. I informed the director for them to be repaired but he said there were no funds available. From last month up to now we have not been able to go to the remote villages.”

Another nurse was of the view that there is the need to provide needed and adequate resource in order to make their work easy and effective.

“a lot needs to be done in order to achieve the desirable results because we cannot execute the task with our bare hands.”

Another challenge is the ignorance and interpretation of the disease. A section of the population, especially those in the remote areas in the municipality have no knowledge about how the disease occurs. They think any disease is the work of the devil so they will rather seek for help from a spiritualist or herbalist rather than the health workers. This makes it difficult for them to accept the various preventive methods.

“we have seen people suffering from malaria being sent to prayer camps instead of the hospital. They interpret their diseases to be the result of the work of the devil. This kind of interpretation of the disease sometimes makes it difficult for them to accept our explanation of the actual cause of the disease.’

The nurses explained that they face the problem of getting the residents to educate them. This is because most of the residents think they already have knowledge about malaria and for that matter there is no need for new knowledge or education about the disease. Some also believe that even if the disease attacks them they can easily buy medicines from pharmacy shops or be cured at the health centers. Some also know the medications for treatment so they do not care about education - if they are attacked, they just go to pharmaceutical shops and order the drugs for treatment. In some cases nurses are driven away or receive abusive comments from some of the residents. Some of the nurses asserted that sometimes they receive abusive comments from residents and this affect them psychologically to the extent that they do not feel like going to the community again.

Most of the residents are rural folks who are engaged in farming activities. The nurses complained that this situation poses a greater challenge to their outreach education on the disease because when they go to the communities; they meet the absence of the very people they are to educate. These residents prefer to go to their farms than to stay in the community and listen to the nurses.

7 DISCUSSIONS

The study revealed that repellents such as mosquito coils and insecticide sprays are the most widely used method to prevent malaria in Dormaa. This is because majority of residents explain that the coil and spray kill the mosquitos instantly and it is easy to use. Although residents complain that the repellents are costly, majority of them still prefare the use of it to the other methods. This revelation confirms (Strickman, et al 2009) study which reports that researches in other parts of Ghana suggests 97% of the people use repellents and such methods prevent about 90% of mosquito bites. It was also revealed that ITN is the second most preferred method used to prevent malaria. This revelation seems to suggest that the Government is really promoting ITNs. As indicated in the literature, MOH (2009) estimates that by the year 2015, about 80% of the population should sleep under ITN and GNA (2012) also reported that 1.9 million ITNs were distributed throughout the country. In spite of this expectation, ITN is not the most common method used to prevent malaria as stated by Lengler (2009). ITN is widely used but its usage trails mosquito coils and sprays.

Majority perceives the methods to be effective and for that matter they used them accordingly. However, there are some residents who have misconception about those preventive methods due to their individual and cultural beliefs. This is in line with (Louis et al 2012) assertion that cultural and behavioral changes, for instance, affect the use of ITN. Anthony, Stella & Pascal, (2005) study in Uganda suggests that people have the misconception that chemical used to treat the nets has negative effect on their health. In fact, some residents complain that they feel like dead bodies whiles sleeping under the nets. This misconception seemingly suggests that the education by health workers on the usefulness of the nets is not enough. During the survey, it was observed that the nurses were only interested in distributing the nets without taking time to educate the people on the significance and appropriate usage of it.

It is strikingly clear that some of the residents in the area are ignorant and therefore do not know the real causes of the disease. Some residents even attribute the cause of the disease to the work of the devil and prefer to seek for spiritual help than to go to the hospital. Up to date a section of the residents in the area do not know that the only cause of the disease is through mosquito bite. This situation poses a greater challenge to the health workers whose education seems to be falling on deaf ears. The farming activities in the area are also considered to be another setback in the prevention of malaria. Most of the people in the community use all the day working in their farms and don't have time to listen to the health workers. This is an indication that the people underrate the havoc malaria can cause. It is therefore important for the community to understand the dangers the disease poses to their health so that they can change their attitude towards the education given by the health workers.

One of the biggest challenges facing the implementation of the malaria preventive methods is lack of funds. Funds from the government and the donor agencies are not released on time and this makes the planning and implementation programmes very difficult. As explained by Public Agenda (2008), the increased spending in the health care goes to other sectors and not the primary health care component, which seeks to reduce malaria and other communicable diseases at the community level. This situation makes planning and implementation very difficult. The nurses explained that they do not know when funds will be available for them to carry out their campaign programmes. It was observed that this lack of funds issue has also affected the procurement of other logistics. The situation at hand requires more vehicles so that the health workers can reach the patients easily in their communities. Unfortunately, the district has few of such vehicles and some of these few ones are even broken and nurses complain they do not even know when they would be repaired.

Another significant challenge facing malaria preventive programmes is insufficient personnel. Ghana has a significant deficit in human resource in the health sector as stated in Ghanaweb (2008) by the former Director of Health Services. This shortage of health workers results from both internal and external migration. The nurses either migrate to the developed countries or from the rural areas to urban centers (Crommett, 2008.) The nurses required to carry out the task are insufficient and as a result, more stress are put on the few nurses available. They complain that the task given to them is too much and put more stress on them. In such a situation, it is so clear that given targets cannot be achieved.

7.1 Ethical consideration

A good qualitative nursing research should be based on well-defined principles of autonomy, beneficence and justice. The researcher must respect respondents and their rights. The researcher must inform respondents about the study and they should be given the right to decide whether to participate or not. The researcher must make sure that his work does not cause any harm to those who take part in the study (Orb, Eisenhauer, & Wynaden 2001).

All ethical factors involved in scientific research were strictly adhered to. Request letters were sent to the participants via the appropriate office. In this situation request letter was first sent to the municipal health administration to seek permission to conduct the interviews. This was followed by introductory letters to the participants about two weeks before the questionnaires. Conscious effort was made to ensure that responds given by participants were anonymously treated so that their identity cannot be traced. Therefore, no name was written on the questionnaires. The data collected was used exclusively for the research purpose and was not be used for any other purposes.

7.2 Credibility, dependability and transferability

Credibility - the participants were well informed in their own mother tongue for them to understand before the questionnaires were answered. One's decision to participate must be free of coercion, undue influence or incentives.

Participants will not be penalized if they decide not to participate any longer.

For a research to valid, it should be evaluable and measurable based upon the target and can be used for future studies (Kendra 2012). All the irrelevant materials were not taken into consideration. The interviewers stuck to their objective and avoided any bias or any self-interest of the participants.

With the **dependability**, the research findings should be well understood and there must be the possibility to get the same results when the same procedures are followed (Lincoln & Guaba, 1985). The people were informed about the whole research process and the meaning of the research. The same questions were-given to all the people who took part and made sure that they all followed the same procedure. Similar answers were taken and critically analyzed. The idea of dependability, on the other hand, emphasizes the need for the researcher to account for the ever-changing context within which research occurs. The researcher is responsible for describing the changes that occur in the setting and how these changes affected the way the research approached the study. The rate at which measurements are giving repeatedly, remains identical and the steadiness of a measurement at a certain period and the relationship of measurements within a given time period (Kirk & Miller, 1986 pp. 41-42).

Transferability means how the results can be used in another environment or group. Thus the data should be able to apply in other settings. (Polit & Hungler, 1999.) According to Payton (1979) transferability is the ability to

generalize from the study sample to the larger population and note the importance of sampling technique in its establishment. In order to ensure transferability, the researchers provided an obvious and diverse description of culture and background, choices and behaviors of participants, data gathering and various process of analysis. A wealthy and strong presentation of the findings with appropriate quotation was used.

7.3 Limitations

It might have been good and useful to engage the residents themselves in the study. It would have been great if we heard the residents giving account of their own experiences, perceptions and knowledge about malaria and the various preventive methods. Unfortunately, time and financial constraints did not permit us to engage them in the study.

7.4 Conclusion and recommendations for further studies

The study reveals that the people of Dormaa Municipality have much knowledge about malaria. They know malaria to be a significant source of morbidity in the area and are using various methods to reduce the incidence rate accordingly. Repellents and ITNs are the most common methods used to prevent malaria in Dormaa. Nonetheless, a significant proportion of the people have various beliefs that affect their perception of the disease and how the disease can be prevented. They have their own unscientific explanation about the disease and the various preventive methods. This situation poses a greater challenge to the activities of the health workers whose aim is to educate the residents on how to prevent the disease through the evidence-based methods. Their beliefs do not permit them to readily accept and practice what the nurses advise them to do.

Inadequate nursing personnel and lack of funds also hamper the efforts to prevent and reduce the rate of malaria in the area. The government, opinion leaders and other stakeholders must pump more funds into the health sector. This will make the health sector more lucrative to attract personnel, and this, coupled with the fact that funds are available will enable the Municipal health service to purchase the needed vehicles. When there are enough personnel and vehicles available, the nurses can easily reach the residents in the communities, educate them and erase the erroneous perception they have about the disease and its prevention. This will ultimately lead to a significant reduction in both the incidence and prevalence rates of the disease in the area.

Based on the findings from this study and conclusion drawn, a number of recommendations are put forwarded for consideration of health works, researchers and policy makers. Upon all the numerous methods being used to prevent malaria in the municipality, malaria continues to pose a major threat to the people. There is therefore, the need to put certain measures be in place in order to improve the situation. The following recommendations are suggested: There should be intensification of education or campaign to erase the misconceptions the people have about malaria. Nurses should intensify their efforts in educating the people on the benefits of sleeping in the nets rather than just giving it out to them.

The government should allocate a greater percentage of the national income on the fight against the disease and such funds must always be available to the appropriate quarters. Again, the fight against malaria should not be the burden of the government alone. Stakeholders, opinion leaders, philanthropists and other members of the community should complement the governments' effort by contributing financially to help fight against the disease. Moreover, the government should train more health workers and also should

make the health sector more lucrative so as to attract more people into the professions. This will help solve the shortage of health workers situation.

Finally, the research was conducted in a relatively smaller area. Taking cognizance of the importance of the enormity of the effect of malaria on the population, it is recommended that future researchers conduct similar investigations in other parts of the country so that generalization could be made for the government and policy makers in their planning and implementation programmes on malaria.

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9. APPENDICES

Appendix 1: Permission to undertake a research

JAMK University of Applied Sciences
Rajakatu 35, 40200 Jyväskylä
Finland

The Municipal Director of Health Service
Dormaa Municipality

Dear sir/madam,

PERMISSION TO UNDERTAKE ACADEMIC RESEARCH IN YOUR MUNICIPALITY

We are students of JAMK University of Applied Sciences studying degree programme in Nursing. We are writing our bachelor thesis on the topic **Prevention of malaria in the Dormaa Municipality of Ghana**. The aim of the study is to find out the experiences community nurses have about residents' knowledge of the existing methods of preventing malaria. The study will also find out the challenges in controlling malaria within the Dormaa Municipality.

The purpose of the study is to provide vital information for policy makers and health practitioners so that they can formulate sustainable strategies for dealing with malaria and its related problems in the municipality. We therefore seek your permission to collect data from your Municipality. We want to interview between 15 to 20 community nurses - at least one from each of the 11 centres. The data that will be collected will be used for research purposes only and will be dealt with anonymously.

We count very much on your cooperation.

Thank you.

Yours faithfully

Paul Adu and Jerry Oware

Appendix 2: Letter of Information

JAMK University of Applied Sciences

School of Health and Social Studies

Jyväskylä, Finland

Dear Participant,

Letter of Information

We are students of JAMK University of Applied Sciences studying degree programme in Nursing. We are writing our bachelor thesis on the topic **Prevention of malaria in the Dormaa Municipality of Ghana**. The aim of the study is to find out the experiences community nurses have about residents' knowledge of the existing methods of preventing malaria. The study will also find out the challenges in controlling malaria within the Dormaa Municipality.

Participation is strictly voluntary and there are no known risks to participate in this study. Participants are free to withdraw at any time and they are not forced to answer questions that they feel uncomfortable to answer. The interview will last between 20 to 30 minutes and the answers will be used for only the research purpose. Your confidentiality is very much guaranteed.

Each participant is advised to sign a consent form to confirm his/her willingness to take part in the study. Do not hesitate to contact the researchers if you have questions concerning your participation.

Thank you for your participation.

Jerry Oware and Paul Adu

Email: G1381@jamk.fi

Appendix 3: Consent Form

CONSENT FORM

Prevention of Malaria in Dormaa Municipality of Ghana

I am signing this consent form to give permission to researchers interviewing me to use my responses for only research purpose. I know that it is a voluntary participation and I can contact the researcher for any question or complain concerning the research. I can withdraw at any point in time.

My identity will not be revealed and my participation will not course any harm to me.

Date and place

Signature of participant

Signature of Student