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African People's Perceptions of Malaria and Its Treatments

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Abstract

The focus of this descriptive, qualitative study was to find how malaria and its treatments are perceived among different peoples of parts of western and northern Africa. The sample consisted of 10 health care workers in western and northern Africa contacted via e-mail, allowing them to document and integrate their findings from experience concerning people's views of malaria. Many studies are available concerning the efficacy of chloroquine, research of new drugs, vaccines, and ideas to reduce malaria; however, few evaluate and publish the ideas of the people, pertinent in implementing interventions to decrease the transmission of *P. falciparum*. This study will add to the body of data available on malaria further improving plans developed for these areas, specifically educational programs for people and people groups who know little of malaria in northern and western Africa.

African People's Perceptions of

Malaria and Its Treatments

Statement and Significance of the Problem

Malaria is a disease so rampant in parts of the world that it has become endemic. However, no matter how common it is to the people, malaria is still very deadly and current research is far from finding a solution to its control or eradication. Although there are many new research programs and studies concerning treatments, the 1992 Aikins et al. survey in The Gambia was the last survey to find how native people perceived malaria and its treatments and preventions. It was mainly focused on bednet usage. There were no other similar studies found addressing people's perceptions of malaria. There is a definite need for further research and more recent research, especially now that so many plans to fight malaria have been implemented. People's attitudes toward this disease as well as its treatments and preventions greatly influence their compliance; knowing these attitudes and ideas will help educators and health care providers modify their plans for decreasing the spread of malaria. Understanding people of western and northern Africa's current ideas toward malaria will help in construction of plans to provide better, more adequate care (von Seidlein, et al., 2002).

Literature Review

As of 1995 300-500 million people worldwide had a clinical case of malaria and 1.4-2.6 million of them died annually. At least 90% of these people were from the sub-Saharan African countries (Nuwaha, 2001). Children between ages five and fourteen are known to have the highest rates of malarial parasite infections (Aikins, et al., 1992).

Sirima et al.(2003) found in their study of pregnant women and chloroquine chemoprophylaxis to prevent malaria that peripheral and placental malaria was common in spite of the use of chloroquine. The infection in the mother was also found to be closely associated with anemia; and infection in the placenta was associated with low birth weight and premature delivery. It is known that early treatment of the disease in any patient will reduce morbidity and mortality (von Seidlein, et al., 2002). However, exact mortality and morbidity rates are very hard to measure in Africa because most deaths occur in rural areas where there are no diagnoses, no death certificates or registrations, and they are known only to the local people. In spite of their immeasurability, epidemiologists are sure morbidity and mortality are on the rise in East and Central Africa because of the development of chloroquine resistant *Plasmodium falciparum* (CRPF) (Nuwaha, 2001).

Discoveries and research have found that people have developed types of hemoglobin that provides them with protection and resistance to malaria. Hemoglobin S has been known for some time. It protects the person by changing the red blood cell into a sickle shape rendering it unable to carry the malaria parasite; however, it does cause problems in a person with two copies of the gene. The person may develop sickle-cell anemia, which can be deadly. Another variation newly discovered in hemoglobin called hemoglobin C is able to provide almost total protection against malaria and has little to no known adverse affects on the person. One of these gene variations called hemoglobin C reduces the risk of contracting malaria by 29% and two copies reduces a person's risk

by 93%. One copy of Hemoglobin S only gave 73% reduction and two copies, a very deadly state, only gave 67% protection (Crabb, 2002).

Malaria not only has physical effects on people, but it also greatly impacts societies. Because adults are too feverish to work, malaria is keeping countries poor. It prevents development of societies and causes families to have lower income. This occurs in some of the world's poorest countries making it even harder for them to escape poverty (Four horsemen of the apocalypse, 2003). However, changes without careful evaluation can actually increase malaria transmission. Socio-economic developments can increase migration of people with little to no immunity into areas where malaria is endemic. Also, irrigation and wetlands management projects in epidemic areas are known to greatly increase morbidity and mortality; however, if this is done in areas of stable malaria and high endemicity it is unlikely to effect transmission rates (Kleinschmidt, et al., 2001).

In order to plan and evaluate malaria control measures accurately and effectively one must know the distribution of the disease. A very good and useful map would show two types of areas: epidemic prone and endemic areas. These two areas would require two very different types of interventions. Epidemic areas would need surveillance of epidemics, stocking of insecticides, and cheap diagnosis and treatments; endemic areas would focus on quick diagnosis and treatment and prophylaxis in pregnant women and children (Kleinschmidt, et al., 2001).

Malaria control and prophylaxis methods have been implemented: "Traditionally four types of intervention have been available for malaria control: chemotherapy,

chemoprophylaxis, personal protection and vector control” (Nuwaha, 2001, p. 1). One form of personal protection and vector control is insecticide-treated bednets. Children who sleep under a bednet have been shown to have reduced infection rates by as much as 50%. The main focus of current control programs is promotion of the usage of bednets treated with insecticide (Yamey, 2000). This is a very effective preventative method in children because they sleep long hours and usually sleep through the dusk hours when mosquitoes are in the greatest number. Sadly, however, very few children sleep under bednets. This problem is in part due to the cost of bednets. But of those using bednets, visual inspections revealed incorrect usage. Some nets were damaged and many were not hung correctly. Some nets were not treated with insecticide regularly also. Because it is so effective it is necessary to emphasize this in community education when distributing nets (Korenromp, Miller, Cibulskis, Cham, Alnwick, & Dye, 2003). Limitations to the net treatment program involve spatial and seasonal variation in net usage. Some people only use bednets during times of the year when mosquitoes are greatest in number such as through the rainy season. Another complication to promoting bednet usage is people only think of them as a way to keep away the nuisance of a mosquito bite without connecting it to malaria (Thomson, et al., 1996).

Chloroquine is currently the first-line treatment in most African nations for malarial infections (Abacassamo, et al., 2004; Nuwaha, 2001). Its use began in the 1940s and replaced quinine. Sulfadoxine-pyrimethamine, also known as Fansidar, is the main alternative for malarial infections (Abacassamo, et al., 2004; Miller, 2002). It has a good compliance rate among the people and it is a low cost drug. There are also few side

effects, and there is no known cross-resistance with chloroquine (Nuwaha, 2001). Amodiaquine was a drug regularly used in endemic areas; however, because of rare, severe side effects it was dropped from antimalarial programs in 1990. In the future, combination therapy may become the popular treatment for malaria. It is very helpful in reducing the rate of resistance development and therefore extends the amount of time this drug can be used (Abacassamo, et al., 2004). Other drugs thought to be useful in treatment are artemisinin derivatives because they suppress gametocytes, the sexual, asymptomatic part of *P. falciparum* that infects the mosquito, where sulfadoxine-pyrimethamine and chloroquine do not affect gametocytes (Miller, 2002; von Seidlein, et al.).

Malaria is rarely medically diagnosed in African counties. In fact, most people who show up with a fever receive antimalarial treatment (Four horsemen of the Apocalypse, 2003; Nuwaha, 2001). It is known that early treatment of malaria reduces morbidity and mortality so therefore it is important to treat quickly. It is also important to realize that many infections are asymptomatic and go untreated (von Seidlein, et al., 2002). Furthermore, in endemic areas of malarial infections, typically pregnant women do not have any symptoms, but this infection can still lead to anemia, placental infection, and low birth weight in the infant. In order to prevent these adverse effects of asymptomatic malaria, chloroquine chemoprophylaxis is highly encouraged and regularly used throughout pregnancy in African women of endemic areas (Sirima, et al., 2003).

The study done by von Seidlein, et al. (2002) shows that children under five years of age are the most common group to seek treatment for malaria. In this report, at the

peak of malaria season more than half of their research population was tested to be positively infected and a large majority of them were five to ten years of age; however, only 20% of the infected people sought treatment. There are reasons so few are believed to seek treatment. Although children are thought to be more susceptible to symptomatic malaria because they are immunologically naïve to the malarial parasite and therefore are the most likely to seek treatment, von Seidlein's, et al. (2002) study found that a majority of the infected individuals in this endemic area were asymptomatic. Another possible reason is the native people search for different treatment sources such as herbs and local concoctions. There are also many people, 75% of people in fact, who use self-treatment. Antimalarials are kept for emergency use around the home and are also bought in their local villages and are therefore never reported to health care facilities (Nuwaha, 2001; von Seidlein, et al). There is a problem with self-medication; however, this can delay treatment by professionals and result in serious injury or death related to incorrect administration of the drugs or incorrect dosage (Nuwaha, 2001).

Even when seeking professional help, many times the treatment is ineffective. The appearance of chloroquine resistant *P. falciparum* is thought to possibly be the result of the very common use of chloroquine medicated salt. This resistance grew very fast and is still strengthening and now, in spite of high levels of resistance, chloroquine has continued to be the drug of choice in malaria treatment (Nuwaha, 2001; Shretta, Omumbo, Rapuoda, & Snow, 2000): "Self-treatment is usually inadequate with under-dosing which may lead to emergence and spread of drug resistance" (Nuwaha, 2001). Although treatment with chloroquine seems to be increasingly ineffective, it must also be

considered that under-dosing and counterfeit antimalarial drugs may be a factor rather than resistance in many cases. A majority of people get their drugs from street vendors claiming their pills have chloroquine in them. In a study Basco, Ringwald, Manéné, and Chandener (1997) did, they found that some of the tablets they tested that had the characteristic N for Nivaquine printed on it had 2.5-18mg of chloroquine phosphate when the authentic drug has 136mg of chloroquine sulfate. In Africa there are no strict regulations of drugs. It is also much cheaper and convenient for the people to buy their antimalarial drugs from street vendors (Basco, et al., 1997).

Another reason for antimalarial drugs' ineffectiveness is the spread of AIDS. This HIV virus reduces the body's defenses and increases susceptibility to malaria (Four horsemen of the Apocalypse, 2003). Poor compliance with treatment regime is also a factor in the increasing number of malaria cases and possibly the increase in chloroquine-resistant malaria. Pregnant women placed on chloroquine chemoprophylaxis have great difficulty complying with the weekly doses. It is hypothesized that this may be due to "saving medicine for future use, unpleasant side effects such as pruritus, and fear of taking bitter-tasting medicines during pregnancy...[and] difficulty remembering to take the drug" (Sirima, et al., 2003, ¶24). Also, it must be considered that there could be potential insecticide resistance. Finally, it is known that long-term use of bednets and preventative interventions in endemic malaria areas can lower the rate at which people acquire immunity, which in turn could increase morbidity and mortality (Goodman, Coleman, Mills, 1999).

Nevertheless, major problems must be considered before advertising the ineffectiveness of chloroquine, the drug of choice, and shifting to a more effective drug. Lay people may demand the second-line drug before enough is available, or they will lose faith in the health care professionals and there will be a decrease in compliance with treatments or they will stop seeking help leading to an increase in morbidity and mortality. But, on the other hand, if chloroquine is not replaced, there will be a continued use of this drug and the people will continue to rely on it resulting in an increase in resistance and more morbidity, severe disease, and mortality (Nuwaha, 2001).

Although not the greatest drug, sulfadoxine-pyrimethamine did decrease case-fatality rates in children in 1993 when Malawi changed to sulfadoxine-pyrimethamine as its first line treatment (Nuwaha, 2001). Abacassamo, et al. (2004) studied the efficacy of six drug regimens on malaria in Mozambique. They found great amounts of chloroquine resistance. They also found that amodiaquine when used in combination with other treatments was a good replacement for chloroquine, and amodiaquine and the three combination drugs they studied showed to reduce fever more quickly than sulfadoxine-pyrimethamine. In fact, all three combination drugs were 100% clinically effective and even were effective against gametocytes. The combinations were amodiaquine and sulfadoxine-pyrimethamine, artesunate and sulfadoxine-pyrimethamine, and artesunate and amodiaquine. The combination of amodiaquine and sulfadoxine-pyrimethamine is effective and inexpensive so Mozambique made this its official first-line treatment for uncomplicated malaria as a result.

The World Health Organization (WHO) and other organizations began a program in 1998 called Roll Back Malaria with the goal of halving the burden of malaria by 2010 (Attaran, Nabarro, Roberfroid, Pannenberg, & Yamey, 2001). WHO desires to make bednets more available and affordable to the public in five years (Yamey, 2000). The chief problem facing WHO's program is cost. Bednets cost around five dollars, which is about as much as the people of Africa spend on their health care per person per year (Four horsemen of the Apocalypse, 2003). WHO wants every at risk family to have immediate access to good, inexpensive antimalarial treatments, and they plan for every pregnant woman in high-risk areas to receive prophylactic treatment and use insecticide-treated bednets (Sirima, et al., 2003; Yamey, 2000). Although chloroquine, which costs about ten cents a dose, is known to be ineffective, it is still being used and more is being spent on it; however other treatments such as combination therapy with artemisinin which are highly effective cost as much as ten times as much as chloroquine. WHO supplies large amounts of the money to buy these treatments and they only supply each country with what they request; but they receive their money through donors and donor countries (Yamey, 2003).

Each of these treatments and preventions fit into the World Health Organization's strategy to fight malaria. They promote a four-step approach to control malaria. First, insecticide-treated bednets must be covering every child while he sleeps. Second, WHO desires to give every pregnant woman at least two doses of an antimalarial drug that is effective. Third, they would like to increase the amount of effective drugs available and affordable to the public. Fourth, plans and strategies for quickly recognizing and

responding to an outbreak need to be made available in epidemic prone areas. This plan can only be completed with sufficient finances available. Two problems WHO deals with are donors not keeping their promises and global funds giving to AIDs and tuberculosis rather than malaria (Yamey, 2003). Another concern is whether or not the money being made available is being used correctly and effectively (Attaran, et al., 2001; Four horsemen of the Apocalypse, 2003).

It is important to find new ideas and strategies to reduce malaria, and, “the starting point therefore is for policy-makers and politicians to understand malaria is not merely a health issue, but a social and economic development issue as well” (Nuwaha, 2001, p. 7). Because of the vast amounts of chloroquine resistant *P. falciparum*, it is time to change first-line treatment to something else such as sulfadoxine-pyrimethamine. In fact, since Malawi made this change, it has experienced a decrease in case-fatality rates of hospitalized children with malaria. One down side slowing the transition to this drug is if its efficacy were lost there would be no effective, cheap drug available to the public and lose of lives would be great; therefore, this change should be carefully considered and all outcomes weighed. An inventive idea to help reduce the rate resistance develops involves training drug dealers, traditional healers, mothers, and shop-keepers on the use of malarial treatments so they can correctly teach people how to use antimalarials and help improve complete dosing. Also, if bednets are used correctly there could be a reduction in the demand for treatment and, in turn, slowing the development of resistance (Nuwaha, 2001).

It is essential for planning and developing programs to know the reason for low use rates of bednets. It must be discovered if it is related to affordability, lack of availability, or simply a failure to use them. Each problem would need a different direction in planning. A failure to use them indicated a need for community health education (Korenromp, et al., 2003). Korenromp's, et al. (2003) study found that use of bednets among children increased with possession, but they also found that many households incorrectly utilized the nets. An effective program to promote these nets should be focused on children and education. The emphasis should be on children because they sleep during the peak hours that mosquitoes are out. Education is a priority to impart correct usage and the importance of year-round consistency. It should be noted, using bednets for children will also change the amount of money spent on them for health care, increasing the cost-efficiency of bednets (Korenromp, et al., 2003).

Von Seidlein, et al. (2002) included in their study of treatment uptake in people with malaria training of mothers. They were taught to recognize signs and symptoms of malaria and they were taught to give the correct dosing to malaria-infected children. In this study group, a 40% decrease in mortality in children under five infected with malaria was seen. This strongly indicates the importance of education and even shows some economic advantages. Also, it is acceptable in most communities making this approach a very promising one.

The key to each strategy and idea for reducing malaria is cost-effectiveness. Some plans such as prophylaxis of pregnant women, increasing compliance, and making second-line or third-line treatments more available, are inexpensive. These would each

use less than one percent of the budget. However, as WHO desires to accomplish this, having all children younger than five years of age covered by an insecticide-treated bednet would use close to 24% of the total health-care budget; and using spraying would use up to 55% of the budget. Also, there are the operational and logistical challenges of starting and promoting these plans (Goodman, et al., 1999).

There is a need for careful, precise guidelines for treatments in order for countries to make choices within their antimalarial policies and provide the necessary data for studying malaria more thoroughly (Shretta, et al., 2000). The cost for the development of a new drug ranges anywhere from \$300-500 million and takes up to 10 years for each new lead to fully be developed. With these drug studies, a new perspective that needs research is focusing on the herbal and traditional products healers use and the people believe to be effective. Possible antimalarial agents may be truly involved in their local healing remedies (Nuwaha, 2001).

Another line of thought is to attack the vectors. The primary vectors in Africa are *A. gambiae* and *A. funestus*. Vector control ideas are directed toward decreasing their vulnerability to malaria, changing their desire to feed on humans, and shortening their lives. In the long-term the idea would be to interrupt the spread of *P. falciparum*; however, this is very difficult to accomplish in Africa because the people are typically bitten as many as 1000 times in a year by an infected mosquito (Miller & Greenwood, 2002).

There is a need for protections against malaria that do not prevent the development of immunity to the disease. Ideally this would be an antimalarial vaccine:

“Pre-erythrocytic, bloodstage, and transmission-blocking vaccines have recently been developed by a number of groups” (Miller & Greenwood, 2002, ¶4). Even with the discovery of a successful vaccine, it will take 10-15 years to fully develop it and ensure its efficacy and safety before it can be distributed to the children of endemic areas (Miller & Greenwood, 2002).

Schofield and Seeberger have found a possible vaccine that attacks the sugar responsible for the lethal and destructive parts of the disease. It attacks the toxins released into the body. Although it is not the ultimate solution to malaria, if successful it will be a great aid in the fight against this parasite. Because it is made of sugar, this vaccine has a few advantages. It does not need refrigeration and may be stronger in fighting resistance of the parasite (Jonietz, 2004).

Other vaccines being developed include vaccines that are DNA based in order to attack the parasite inside the red blood cell at the DNA level. Naturally, people exposed to *P. falciparum* gradually develop immunity; however it is short-term and strain-specific. The people must be repeatedly infected to maintain their immunity. This immunity is based on antibodies and T-cells. Vaccines are being studied and developed to induce this antibody and T-cell response at a stronger, broader, and longer rate. Pre-erythrocytic vaccines aim to prevent the parasite from developing and therefore prevent the release of harmful toxins. Another group of vaccines under development are focused on the blood-stage of the infection. They are aimed at preventing red blood cell invasion, which would in turn prevent the disease. Finally, there are vaccine studies focused on the sexual-stage. The mosquito would get a dose of antibodies that prevent fertilization of the parasite

during their blood meal. It would then stop fertilization of the gametocyte in the mosquito. This vaccine would protect communities rather than simply individuals (Moorthy, Good, & Hill, 2004).

Much research is needed and further development of treatments and preventions is necessary; however, unless the people know and desire these changes, it will not be effective. Therefore, further study is also needed into the perceptions of the people toward malaria and its treatments. This will enable health care professionals to better treat and care for the people of Africa (von Seidlein, et al., 2002).

Research Question

How is malaria and its treatments perceived among different groups in parts of western and northern Africa from the perspectives of medical personnel working with or who have worked with the people? The key variables of interest in this study are listed below. Malaria is a disease caused by the parasite *P. falciparum* whose life cycle involves both humans and mosquitoes. Treatments are anything health care professionals use to stop or prevent the transmission and progression of malaria. People of parts of western and northern Africa involve any group of people with which the medical personnel surveyed have contact and who live in any country located from West Africa to Egypt to Kenya. Medical Personnel include medical doctors and nurses currently working among the people or who spent time working with them in the past.

Methodology

Study Setting

This study is set in western and northern Africa. This includes anywhere from West Africa to Egypt to Kenya. This area is very prone to endemic and epidemic types of malaria. The study involves medical personnel working among groups of people in this region.

Research Design

The design of this study is descriptive qualitative. The interview schedule consisted of five questions. Each question was open-ended and allowed for the interviewed person to answer as completely as he or she felt appropriate. It also allowed for them to perfect their answers before sending them.

Sample and Sampling Procedure

The sample is a sample of convenience. The survey was e-mailed to different medical professionals in western or northern Africa or who have spent a considerable amount of time on this field. The e-mail addresses were acquired from acquaintances and mission agency recruiters present on the Liberty University campus during Mission Emphasis Week, February 12-16, 2004, and from individuals who have contact with health care workers in this area. The e-mail with the questions served as an implied consent of participation in this research study by any persons who replied; and individual identities will not be disclosed, as the information given will be presented as an entire body of data.

There were approximately ten medical personnel surveyed. The inclusion criteria are as follows: medical personnel, working among the people of northern and western Africa or recently worked with the people, access to e-mail, able to read and write in English, and any ethnicity or nationality.

Data Collection

Surveys consisting of five questions (see Appendix) were delivered via e-mail. Only one survey was sent to each contact. The first few replies were analyzed for themes or problems. No questions were modified or added to the next e-mailed surveys.

Strengths and Weaknesses

There are several strengths to this study. Some subjects surveyed are from the same area therefore their answers may be compared. This enables the analysis to be more complete and accurate. It also has the ability to be re-evaluated with each reply so that modifications and clarification can be made or questions can be added for the next survey sent. Because the survey is written it allows the subjects to answer the question at their convenience. Finally, my Liberty University honors thesis committee members have reviewed my work on this study several times throughout the process.

Conversely, there are weaknesses inherent in this study. Most importantly, the study cannot get its information directly from the people for their perspectives; medical personnel and health care providers must give their opinions based on their experiential observations. Additionally, because it is written, rather than face-to-face, there was not an opportunity for clarification; however, they would be able to read their answers and make changes. Other problems include the data collection tool is not officially tested for

reliability and validity, there are a limited number of questions asked, and the study is too superficial for a true qualitative study. It is also important to note there is an inability to get data from an even distribution of northern and western Africa. The study covers select groups of people and parts of northern or western Africa. Finally, it is a sample of convenience and very small, therefore it is very weak in validity and generalizability.

The people medical professionals work with are members of people groups in Africa. Comparing the data from medical personnel all over western and northern Africa will allow for similarities across the continent to stand out and those similarities can be used in the development of antimalarial programs to be applied throughout the area.

Results

Replies were varied among responses. In this section, each reply to the questions will be identified by the country and title of the medical personnel rather than their name. The countries mentioned in this study are Kenya, Ghana, NE DRC (or former Zaire), Mauritania, Niger, and the Republic of Congo. The medical personnel included seven doctors, including one pediatrician and one surgeon, and one certified nurse midwife. Several of the doctors' wives are nurses and their perspectives were sometimes included in the doctors' replies.

1) What culture/people group do you primarily work with? Are there subcultures? If so, what are the differences between the subcultures (i.e. Religious beliefs, social/economical status, location, etc)?

Kenya 1, Doctor: "We work primarily with the Marakwet people of Kenya (a country in East Africa). They are a sub-tribe of the Kalenjin group. The area where we

live is in the highlands of Kenya overlooking the Kerio Valley. Most people in this area have been evangelized and there are many professing Christians. Many people still hold to their customs and traditions, including female circumcision. The people we work with for the most part are subsistence farmers.”

Ghana, Surgeon: “At Baptist Medical Centre in Nalerigu, we have more than 20 different people groups being served on a regular basis. We serve all to the best of our ability but our efforts are probably most effective with the Mampruli-speaking groups. Differences are seen in burial practices and marriage customs; there are also differences as to which groups are predominantly Muslim, etc.”

NE DRC (former Zaire), Doctor: In the Bunia/Beni area of former Zaire with the Nandi, Lendu/Hgiti, and Hema (a city and rural people). Hema are herdsman. Most of the rest of these people are farmers, although the city dwellers and the Nandi do a lot of commerce. There is a strong animistic overlay to their belief systems.

Mauritania, Doctor: “In Wolof near Richard Toll.”

Niger, CNM: “I work with the Western Fulani of Niger. They have many different linyals or groups related by families or professions but all are Moslems. Many also follow traditional animistic practices/beliefs. Most all are very low income. At one time all were cattle herders but famine several years ago wiped out their herd so they have now become farmers. The majority live in rural scattered settlements although more and more are living in the capitol, Niamey, as they move there looking for work.”

Impfondo, Republic of Congo, Doctor/Nurse Team: “We primarily work with Bantu & BaAka Pygmies. There are subcultures with very different religious beliefs, social/economical status, location, & world views.”

Kenya 2, Pediatrician: “I worked among the Kalinjen people of western Kenya.”

Kenya 3, Doctor: “Kikuyu (some related groups Meru and Embu that are not in our area) and Maasai (9 subgroups through southern Kenya and northern Tanzania).” He also said there were “no significant spiritual belief differences among subgroups of the tribes. There is a strong Christian church in the Kikuyu (churches since the 1900s) and growing church among the Maasai.”

2) What do the people groups perceive malaria to be (i.e. A judgment from a god, evil spirits, simply a physical illness, bad luck, etc)?

Kenya 1, Doctor: “It is commonly thought that it is a disease associated with playing in the rain water or being rained on - and one that requires modern drugs for treatment.”

Ghana, Surgeon: “Sicknesses are not usually associated with the physical aspects of life (e.g., where your drinking water is from). Most bad things that happen to you were caused by a spirit, an unhappy ancestor, a witch, etc.”

NE DRC (form Zaire), Doctor: “The concept of malaria can be fuzzy in many people’s minds as ‘malaria’ is a generic term for any febrile illness.”

Mauritania, Doctor: “People here recognize that malaria is transmitted by mosquitoes, but that they feel that there is a ‘why’ behind catching the disease (i.e. Who

sent the mosquito?). People feel that the local Muslim clerics (called Marabou) may have cursed the person and this leads to the mosquito biting and the person becoming ill.”

Niger, CNM: “The hard thing about answering this question is that people don't know what malaria is. You diagnose and treat malaria on the basis of symptoms here in the bush as there are no labs. The symptoms are fever, joint pains and headache with or without diarrhea and vomiting. As you can imagine this can also be symptoms of other illnesses. For the most part, most patients are treated for malaria with any or all of these symptoms and may be treated for other things as well 'in case'. Anyway, because of this they wouldn't have a certain perception of 'malaria'. As it is so common, most people ignore these symptoms and are better in a few days. If they get worse or it continues then they may buy paracetamol (Tylenol) in the market. If that doesn't work they will try and get to a clinic. I think I would say they perceive it to be a physical illness rather than any of the others listed.”

Impfondo, Republic of Congo, Doctor/Nurse Team: “Most people think it is a physical illness transmitted by mosquitoes, but the mosquitoes can be sent by evil spirits or sorcery.”

Kenya 2, Pediatrician: “Malaria is perceived simply as a physical illness.”

Kenya 3, Doctor: “Malaria is often just considered a nuisance. It is like getting a cold or flu in the US. Despite efforts to help prevention efforts, few use nets or prophylaxis medicines because they've always gotten it and will get it again.”

3) Do the people have folk treatments or beliefs for the treatment of malaria, such as herbs, witch doctors, etc.? If so, what are these treatments?

Kenya 1, Doctor: “Some people will resort to using herbal treatment (fresh or boiled sap from mashed leaves or roots); or rubbing powder/ash in the skin if conventional medical treatment fails.”

Ghana, Surgeon: “There are numerous local healers, who will mix up some concoction to drink or a salve to rub on or, very popular, will make small cuts in the skin at the site of the symptoms and rub a special medicine into the wounds. Instead or in addition to, they may go to the local shaman to discover why this happened to them (e.g., who cast this spell?) and/or how to be rid of it, such answers/cures usually involving the sacrifice of some animal.”

NE DRC (former Zaire), Doctor: “The non-medical treatments seem directed at different signs and symptoms of the disease. Efficacy of treatment is difficult to judge as the disease is endemic in the area and most people over 5 years old who are not pregnant have pretty good immunity (thus suppressing the disease temporarily may be enough to let the patient’s immune system take over).

“One treatment is for folks to make up a water-based mixture of different fruits (guava seems to be a major component) and to sit on the ground with the basin between their legs, bending over the steaming mixture, inhaling the fumes, with a blanket over themselves and the mixture (to hold in the fumes). I am not sure how effective this is, but we occasionally get folks in for burn treatment when they spill this mixture on themselves.

“The Nandi take a bitter root when they have a malarial attack. I am told by a missionary nurse (who has tried this treatment on herself) that it works. Sorry, I don't know which root.

“The anemia that comes with falciparum malaria is treated traditionally by giving the patient guinea pig blood to drink. This probably helps the anemia, although other foods or oral iron may be as useful. Note that it does not address the malaria protozoan itself.”

Niger, CNM: “Again, as I stated above, because they don't really know a sickness as 'malaria' it's hard to say exactly. If they should have malaria for a long time and it doesn't get better they may try various local treatments (including 'herbs or roots' or the 'witch doctor' who is known here as a 'jiimaajo'). One thing is that with children who have malaria for a long time and tend to get enlarged spleens as a result, they will detect the enlarged spleen and a jiimaajo will make small cuts over that area to let the 'evil spirits' out. They also sometimes do this sort of thing when a person has a high fever, causing their pulse to go up - they notice the heart beating in the chest and believe something is trying to come out so the jiimaajo may make small cuts over the area of the heart to allow 'it' to get out. In some cases, because it is a febrile illness, the child may be bathed in a mixture of boiled leaves which they feel will help the fever come down.”

Impfondo, Republic of Congo, Doctor/Nurse Team: “There are probably over 100 folk treatments for malaria in our area. There are numerous different herbal remedies, incantations, rituals, and ways to pray.”

Kenya 2, Pediatrician: “Antimalarials were freely available and people would often take them any time they started with a fever.”

Kenya 3, Doctor: “Some herbal remedies, but the drugs for treatment are sold in all the corner shops so easily available but also the reason there is such resistance to chloroquine now.”

4) How do their perceptions of malaria and its treatment affect their acceptance and use of conventional treatments such as insecticide treated nets and drugs like Chloroquine and Fansider?

Kenya 1, Doctor: “Medical treatment is first choice. But use of insecticide treated nets is very low because many people do associate malaria with rain and not mosquito bites (NB - transmission of malaria is very high in wet humid conditions.)”

Ghana, Surgeon: “There seems to be wide acceptance of many "western" medicines because they have seen them work when used properly. The Ghana Health Service has wide-spread projects and efforts to educate the masses about the role that mosquitoes play and how to avoid them. With most other sicknesses it seems to be a different story. I have finally reached the conclusion that almost everyone who comes to our hospital has already been to a local healer at least once. For some reason they think that our medicines are better, stronger, or whatever, even though we issue the same chloroquine they can get at any pharmacy or even in the local market. They're often surprised, sometimes annoyed, that we use this same medicine.”

NE DRC (former Zaire), Doctor: “It is generally accepted (in our area – not true in Azandeland in the way north) that Western medicine is effective. The traditional

healers have pretty much stopped directing opposing the medical people. They instead sell charms 'so that the doctor's medicine will work'. Not that many medical people have animistic beliefs and dabble in what we would call spiritism.

“Health education songs, radio announcements, and personal contact by national workers all seem to help convince people to use bednets. One of the reasons given for trying traditional treatments is that they cost less.”

Niger, CNM: “People are very eager to be treated with medicines so there is absolutely no problem treating malaria with chloroquine/fansidar or whatever drug you use. The only problem with chloroquine treatment is that it is a well-known drug here, sold by local market drug sellers and therefore is thought to be a not very 'good' drug. When you advise someone to take chloroquine they sometimes plead with you to give them some 'real' medicine. Again, because it is so widely available, it is usually taken in wrong doses. When someone doesn't feel well they may buy 25 franc worth (about 4 tabs) take them all at once, or 2 in am, 2 in pm then when they aren't any better seek other treatment. Even, when advised how much and for how long, because the drug has such a low regard by people, they often won't agree to buy so much.”

Impfondo, Republic of Congo, Doctor/Nurse Team: “There is a good deal of synchronism. Most people try very hard to sleep with a mosquito net. Even the poorest of the poor try to have them (though they may be in shambles). Very few know anything about treating their nets with insecticide. People often use traditional treatments first, or in conjunction with Chloroquine and Fansider, which they take like aspirin at home

before going to a nurse or doctor only if they aren't getting better. People rarely take a complete treatment, but simply stop taking the medicine once the fever goes down.”

Kenya 2, Pediatrician: “We were up around 7,000 feet and no one used nets. Meds were readily accepted and taken too frequently before Malaria was properly diagnosed.”

Kenya 3, Doctor: “Not the main barrier; costs of nets is difficult since the disposable income is a problem.”

5) What must happen to a person or his family before he will come in and/or accept treatment for malaria?

Kenya 1, Doctor: “Most children (especially under 5 years) are likely to be taken to hospital. Older children and adults are likely to ‘self-medicate’ themselves – i.e., buy antimalarials from a drug store without a prescription.”

Ghana, Surgeon: “Often a patient has had symptoms for several days before seeking our help. During this time I'm sure they're taking something from either a local healer or some pill they've purchased at the local market (some entrepreneur sets up a table somewhere in the local market and you find a variety of shapes and colors of pills, often lying in a pile without the original packaging - you're taking this "pharmacist's word that the red-and-yellow capsule he sells you is truly cloxacillin).”

NE DRC (former Zaire), Doctor: “One of the reasons given for trying traditional treatments is that they cost less.”

Mauritania, Doctor: “People here are pragmatic and know that they must seek treatment with medicines.”

Niger, CNM: “For an adult, the person has to be pretty miserable to come for treatment because it is so common and so many of them do seem to 'get better' after a few days, or a few Tylenol without treatment. If there is an inexpensive clinic nearby, they will seek help earlier with complaint of bad headache and aches in all their joints. For children, they are often brought late because the clinic is far away; work at home takes priority, other family members [may be] ill and [the family may be] unable to leave, [so] with the help of a dose of Tylenol the child seems better for awhile. Also, there is a general 'understanding' that children are 'likely to die when they are young' so often they don't go to extreme measures to seek help. As far as accepting medical help for most diseases, this is not a problem. The main problem is that medical help is just not available so they must try and find ways to help themselves, i.e. jiimaabe, herbs, market meds, etc.”

Impfondo, Republic of Congo, Doctor/Nurse Team: “They have to be pretty sick. They have to find their health notebook (or buy one if they don't have one), and they have to get enough money together for their blood smear and treatment. Often they don't have money for all three.”

Kenya 2, Pediatrician: “They readily accepted treatment.”

Kenya 3, Doctor: “Get sick enough. Most treatment is in the community; only the sickest get to a dispensary or hospital.”

Discussion

Several themes were noted within these responses: (a) knowledge of malaria with its causes, the use of the name ‘malaria’, and the origin of the illness; (b) acceptance of

western medications including the knowledge of medications and treatments in relation to the people's physical location, the use of local treatments first because they are cheaper with a focus on the symptoms, and different expectations of western medication in relation to physical location; and (c) involvement of animistic and spiritual beliefs in the origin, and treatment of the illness.

Knowledge of malaria varied according to the physical location of the people group, especially in relation to cities. Those who lived close to or in urban areas seemed to have a better understanding of this disease, its origin, and its treatments and preventions although they did not show a thorough understanding of it; however, people in the brush typically use the word 'malaria' or a similar term to describe a set of symptoms that may or may not be malaria. For example, the peoples in Kenya seemed to be more educated than most people groups but according to the first doctor from Kenya, people still associated the disease with rain rather than a mosquito. The word 'malaria' in many places is simply a word to describe a febrile illness according to the doctor from NE DRC, the second doctor from Kenya, and the CNM in Niger. The people in Mauritania knew it was caused by a mosquito but they still insist on including spiritualism. For example, they view the mosquito's bite as a direct result of a specific curse on the person infected with malaria. This is true in the Republic of Congo as well according to the doctor/nurse team; and the surgeon in Ghana said many people believe that most bad things that happen are related to something spiritual such as a spirit, an unhappy ancestor, or even a witch.

No matter the perceived origin or cause of the illness, there was an overall acceptance of western medications seen in each reply. The use and knowledge of these treatments and preventions however varied. For example, in Kenya where the general awareness of malaria is higher, the people 'resort' to herbal treatments if western medications are not working for them; and the use of bednets is low because they associate the disease with rain rather than mosquitoes. However, other places such as Niger, malaria is so common, treatment is only sought out if the illness will not go away and all forms of treatment are accepted and wanted but western medications are not always available so traditional treatments are used. Traditional treatments generally focus solely on symptoms. Also, on the other end of the spectrum, in Ghana western medications are accepted readily because they are perceived to work and bednets are very commonly used as it is a tradition and because the Ghana Health Service has wide-spread projects and educational tools directed to the masses promoting bednet usage; but local healers and herbalists are generally sought out first since they are cheaper than the hospital. This is also true in Republic of Congo. Another example, in NE DRC the traditional healers now offer charms to help the doctor's medicine 'work' rather than opposing the western medications. Cost is a huge factor in the people's acceptance of traditional treatments prior to conventional one in NE DRC, although because of good educational program there, bednets are used more. Finally, it is of interest to note the people in Niger are so familiar with chloroquine and perceive it to be useless that they refuse it at the clinics. They do not take it correctly, and therefore it is ineffective but they

only see that it does not work so they refuse to buy the correct dose or take it for the correct amount of time. This is also a problem in Kenya.

Local treatments on average are used first because they are cheaper; they seem to be primarily focused on symptoms rather than curing the disease. For example, in Ghana local healers are used and they give people concoctions to drink or salves to rub on their body or medicine to rub in small cuts made in the skin at the site of the symptoms. It is true that people who live in endemic areas have a higher immunity towards this disease and therefore in places such as NE DRC or Ghana if the treatment even slightly suppresses the disease their immune system may be able to take over as the doctor there suggested. Some treatments do not address the disease at all but do help with symptoms; for example, in NE DRC people drink guinea pig blood, helping treat anemia whether the people know it or not. Other treatments are focused on symptoms but do not help at all, such as these examples the CNM from Niger gave: a *jiimaajo* may try to let the evil spirits out thought to be seen or felt in the body, like an enlarged spleen in children or a racing heart in adults. On the other hand, in places such as Kenya, antimalarials are readily available at the local corner shop so few other treatments are sought out even though there is a high resistance to chloroquine. Yet again in other locations, traditional treatments are cheaper so they are received first simply because of finances. The only problem with self-medication, except incorrect usage, is just as the doctor from Ghana described: “a variety of shapes and colors of pills in piles without packaging and only the pharmacist’s word as to the true medication and dosage of each pill.”

Expectations of western medications differ according to location and perception of its effectiveness with regard to cost. In Kenya according to the third doctor, people do not quickly go to the doctor because it is simply a nuisance and no matter what they do, they have always gotten it and will always get it again in their minds. Also, as mentioned before, in Niger the people incorrectly use the antimalarials such as chloroquine and it is therefore ineffective, so they do not believe it is a good drug. The same problem is associated with the people in Ghana: when they acquire their medication at a local healer's shop and it is ineffective, they go to a doctor's office expecting the medicine there to be stronger and better. They are upset often and surprised when they realized the doctor uses the same medication as the local corner pharmacist. However, not only do they incorrectly take the medication but they may not be receiving the dose they should in order for it to be effective because of the chaotic manner in which the pharmacist sells drugs.

Because for so many of these people malaria is so common and many seem to get better only a few days later, treatment is frequently only sought out when the person is miserable. If the people understand malaria and know its treatments, they will go to a clinic or some place and get an antimalarial, and usually children under five will be taken to a clinic sooner; this is regardless of location and distance to clinics. However, in places such as Niger where the CNM is working, education and understanding levels pertaining to malaria are low, there is a general acceptance that children will die so they are the last to receive treatment; and others will receive treatment only when it is really bad. For

many, medical facilities are too far, so a jiimaajo (or a similar person), herbs, or market medications are the only thing they use.

The third major theme seen throughout the answers to the surveys was that people still found some way to involve their animistic or spiritual beliefs into the origin of the disease, or at least the treatment of it. For example, the Australian doctor said the people where he worked in Mauritania knew malaria was caused by a mosquito, but they said it originated with a curse possibly from a Muslim cleric called a Marabou. The people of the Republic of Congo also believed the mosquito was sent by an evil spirit or sorcery according to the doctor/nurse team there. In Ghana, the people may go to a shaman to find out why they have malaria and how to be rid of the disease, associating its origin and treatment with spiritualistic beliefs, and they often they will offer an animal sacrifice of some kind to try to cure the disease. As mentioned before, many people in Niger go to a jiimaajo who will respond to what he sees or feels by trying to let the evil spirits out with small cuts over the areas. Even in the Republic of Congo there are many incantations, rituals, and prayers offered to try to get rid of malaria. Another attempt made at keeping spiritualistic beliefs involved in the cure of malaria is seen in NE DRC where traditional healers now sell charms to help the doctor's medicine 'work' rather than opposing their medicine completely.

As seen, there is an overall lack of knowledge of the disease of malaria but the deficit increases greatly the farther from urban areas people are located. There is also an overall acceptance of western medications but finances and expectations can hinder people from actually acquiring antimalarials or bednets. Also, it did not matter the

location, there seemed to be some way the people found to involve their past animistic or spiritual beliefs in the disease process or treatment.

Implications for Practice and Research

Although it is obvious WHO and other organizations have accomplished a lot when even the most rural tribal people know an antimalarial, there is still a lot of work to do in the realm of education. People need to know and understand its carrier is the mosquito in order to be motivated to use a bednet appropriately and some of their traditional treatments need to be addressed specifically, especially if they can be harmful but people also need to be allowed to use harmless and even possibly effective local treatments to give them a sense of autonomy. The rural areas and the bush are especially in need of focused attention. They are harder to reach and therefore have received little to no education or resources and children are dying unnecessarily as a result.

The last official study published on people's perceptions of malaria and its treatment was in 1992 and it solely focused on Ghana with an emphasis on bednet usage (Aikins, et al., 1992). There is a huge deficit of published studies of the efficacy of WHO's involvements and efforts as well as other countries efforts and other organizations involvements. Research needs to focus on efficacy of education, proper use of treatment, use of possibly dangerous traditional treatments, and the current trend in the acceptance and expectations of western medications, especially with malaria's increasingly high and wide-spread resistance to chloroquine and other antimalarials.

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Appendix

Survey

Dear _____,

I am a nursing student at Liberty in my junior year. For the thesis I am writing, I am interviewing doctors and medical missionaries who have worked or are working in the northern or western parts of Africa. My research topic is how malaria is perceived among the people of parts of western and northern Africa.

I have five questions and I would greatly appreciate your help. These are the questions I have for you:

1. What culture/people group do you primarily work with? Are there subcultures? If so, what are the differences between the subcultures (ie. Religious beliefs, social/economical status, location, etc)?
2. What do the people groups perceive malaria to be (ie. A judgment from a god, evil spirits, simply a physical illness, bad luck, etc)?
3. Do the people have folk treatments or beliefs for the treatment of malaria, such as herbs, witch doctors, etc.? If so, what are these treatments?
4. How do their perceptions of malaria and its treatment affect their acceptance and use of conventional treatments such as insecticide treated nets and drugs like Chloroquine and Fansider?
5. What must happen to a person or his family before he will come in and/or accept treatment for malaria?

Thank you again for your help. For your information, your identity will not be disclosed in this research project and the information collected will be presented as an entire body of collected data. Also, providing information on this survey implies your consent to participate in this research study. God bless you and know that I will be praying for you and your ministry as I work on this project.

In His Love,

Stephanie Dean

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