Assessing the Burden of Malaria at the Pothawira Clinic in Malawi

A Clendening Summer Fellowship Proposal
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2014
I. INTRODUCTION

An estimated 627,000 people died from Malaria in 2012 with the largest number of deaths among young children in sub-Saharan Africa. Malawi is a small agricultural country in Africa and although progress is being made in reducing the prevalence of malaria, it is still one of the leading causes of morbidity and mortality. Pothawira clinic serves the Salima area of Malawi with around 125-150 children and mothers treated at the clinic each week for malaria related symptoms. The purpose of this study is to determine the burden of malaria among patients treated at the Pothawira clinic. This will include collecting data on the current number of patients presenting with malaria-related symptoms, utilization and demand rapid malaria tests and medicine for treatment, and awareness of prevention techniques among the populations that come to the clinic. This project will include going through the limited records that are available at the clinic and collecting survey and observational data over an 8-week period regarding the chief complaints of those entering the clinic. This data will serve as a base line to gain an understanding of the demand that malaria and malaria related symptoms puts on the clinic, its resources, and the people in the surrounding villages.

II. BACKGROUND

This project includes many aspects of health and medicine that are important to the globalized world, to the University of Kansas Medical Center (KUMC), and to my area of personal interest as well. Malawi is one of the more underdeveloped countries in the world and although the Malawian government and people have come along way in overcoming corruption and economic hardship; widespread poverty and disease still plague the population. The country relies heavily on outside aid in all sectors of its infrastructure, but particularly in health. There are a number of overseas organizations and international programs that are partnering with local groups and clinics to better the lives of the Malawian people. This type of international collaboration and focus on global health is a key movement in the healthcare systems of today and a focus seen throughout KUMC.

My personal interest and journey in international healthcare began long before the start of this proposal. I have served in many underserved areas throughout my life, and each experience has only deepened my goal to focus on global health in my personal career. My path to medicine started by working with special needs children in several different environments: summer camps, school, a Mexican orphanage, and mission trips. I was fascinated by the difference in capabilities of children with different access to medical and emotional care. During my undergraduate career at the University of Arkansas I spent two years studying the cultural effects of HIV/AIDS in South America. I eventually wrote and defended an honors thesis, “Theory and Reality in Public Policy: The Case of HIV/AIDS in Contemporary Chile” based on this research. The project took me on a study abroad to Chile where I was able to use my Spanish language skills, immerse myself in the society, and gain a better understanding of the cultural and socio-economic barriers that face many Chileans in their access to treatment for HIV/AIDS. After my study abroad experience in Chile, I realized that I am not just interested in the direct medical needs of people but also in their access to care and their barriers to that care.
All of my past experiences and international travel have brought me to where I am today - in medical school. I have become involved in a variety of organizations and activities in medical school in order to continue working with global health and international programs. I have been particularly interested in OBGYN as a specialty for the future because of the access for women and children and their particularly unique medical and cultural obstacles in the world today. I serve as a Junior Student Director in the Women’s Health Night at the Jaydoc student clinic and I am a member of the Student Governing Council of KUMC. Through these activities, and after showing interest in a Clendening Fellowship, it was suggested by faculty members that I reach out to Dr. Sarah Kessler.

Dr. Sarah Kessler, from the department of Family Medicine in their Research Division at KUMC, has researched global health and medicine in a variety of ways. Most of her research focuses on decreasing the impact of HIV/AIDS in Africa, particularly through reducing the number of infants born with the disease. Dr. Kessler has worked tirelessly on the HIV Infant Tracking System (HITSystem) that aims to advance the communication between patients and healthcare providers in order to improve care. Dr. Kessler’s research with the HITSystem has now expanded from Kenya and Uganda to Malawi as well. Dr. Kessler explained to me the type of work that she does and the populations of people that she works with, and was especially excited about the possibility of the Pothawira clinic in Malawi being a future option for an international rotation for KU Residents. We spoke about my past experience, and the current needs of her work and those with whom she works. While data collection is taking place for HIV and AIDS patients, there is very little information on the demand that malaria puts on the clinic in Malawi. Although it is known that malaria symptoms are a large portion of chief complaints at the clinic, especially for pregnant women and children, there is no baseline data to use for ordering treatment and medication, obtaining rapid tests, tracking statistics, or for targeting community based outreach and education for prevention.

III. DESCRIPTION

Malaria

Malaria is the most important of the parasitic diseases in humans, transmitted by the bite of an infected mosquito. There are five species of Plasmodium parasites that cause Malaria and P. falciparum is the species that causes almost all deaths due to malaria. P.falciparum is the most common species of malaria in the Salima District of Malawi. The disease can be difficult to diagnose, as some of the first clinical symptoms are very nondescript. These early symptoms can include fever, chest pain, abdominal pain, and headache. These are all signs of most viral infections as well. Untreated malaria due to P. falciparum can lead to severe anemia, hypoglycemia, renal failure, and convulsions. Underdeveloped or suppressed immune systems put patients at a particularly high risk for complications with malaria. This includes pregnant women, young children, and patients with HIV. Over 90% of the world’s malaria cases and deaths are found in sub-Saharan Africa where poverty and widespread HIV infection put many people at increased risk for
infection and complications. The tropical climate of the region, and the extended rainy season increase the transmission of the parasite.

Because of the nature of the early symptoms of malaria infection, Rapid Diagnostic Testing (RDT) has been developed. The RDTs are a simple, quick antibody card or stick test to determine malaria status in patients, and are recommended for use with anyone presenting to a clinic or hospital with fever in the sub-Saharan region of Africa. Uncomplicated malaria can be treated with oral Chloroquine, but severe malaria is a medical emergency that will require much more than oral medication. It requires nutrients, fluids, steroids, malaria medication, sometimes hemodialysis and intensive nursing and monitoring. For pregnant women, quinine or quinidine should be used as prenatal antimalarial treatment. There are also some prevention techniques, outside of prenatal care, that can be used as well. The most widespread and promoted prevention technique is the use of nets for sleeping underneath in the home.

Malawi is a land-locked country in south-central Africa where malaria is pandemic. The most common species of parasite in Malawi is *P. falciparum* and it causes almost 98% of all infections there as well as almost all deaths due to malaria. Transmission of the disease peaks during the rainy season from November to March and is also higher in the wetter areas close to the large Lake Malawi on the East side of the country. A study completed by the Presidents Malaria Initiative and Operational Plan estimates that around 6 million cases of malaria are treated each year in Malawi. This accounts for 40% of all hospitalizations of children under five and up to 60% of hospital deaths in this age group are also attributed to malaria and malaria related anemia. Malaria is essentially a completely preventable and treatable disease, and yet it kills hundreds of thousands of children and adults each year. There are a number of organizations and projects including the Malaria Operational Plan and Global Health Innovations that are working to decrease these numbers with RDT, treatment, prenatal care, as well as increased prevention education and action, but there is still more work to be done.

**Pothawira Clinic**

Pothawira means “safe haven” in Chichewa, Malawi’s native language. It was created and is still run by Malawians Peter and Emma Maseko. Pothawira is a complex that has a church, school, orphanage with children’s homes, and a medical clinic that serves the Maganga village and beyond. The clinic itself sees and treats nearly 150 malaria cases each week. Dr. Kessler works closely with Brad Gautney and Global Health Innovations to bring both the HITSystem and malaria care to Salima, Malawi and the Pothawira clinic.

**Project Proposal**

This project has been split into stages: Preparation, Observation and Assessment, and Consolidation and Analysis.

The **preparation stage** will be completed before I travel to Africa. It includes working with Peter Maseko and Dr. Kessler to determine how best to assess the burden of Malaria on the Pothawira clinic as well as developing the skills I will need to complete the project once I am on the ground. One of the most important parts of this stage is gaining an
understanding of the language in Malawi so that I can be effective in the clinical setting. Over the next few months I will be studying Chichewa through an online program called Instant Immersion. On top of this I have purchased a study dictionary and will be specifically building my medical vocabulary. Outside of intensive language studies, it is important that I continue to increase my knowledge of Malawian culture, Malaria, and the workings of the Pothawira clinic. Dr. Kessler has continued to offer advice and guidance on the project and I will be keeping in close contact with her as I further my plans before going to Africa. The main thing that I will be working with Dr. Kessler on is developing a survey that both contains the information that is needed to assess patients’ knowledge, attitudes and behaviors regarding malaria prevention and treatment that is also feasible to give in the Pothawira clinic setting. The World Health Organization has developed a survey that has been used as a rapid assessment of malaria across many regions of the world and this has been a great start to developing a survey to use in Malawi. Before leaving I will be meeting with Brad Gautney to learn more about how the clinic works on a day-to-day basis, and how I can be helpful with patients while I am there. I will also be corresponding with Peter Maseko and his daughter, Dr. Annie Maseko who resides in Houston, TX, so that I know more about the kind of data and assessment that will be helpful to him and his team in the future.

The observation and assessment stage will be performed in country. In her research, Dr. Kessler emphasizes the importance of understanding the culture of the people you are working with, before you can truly understand the problem. In agreement with this philosophy, my first few days in Malawi will be strictly observational. It is a time to see how everything works at the clinic and experience first hand the culture in Malawi and at Pothawira. After getting more comfortable with the surroundings, my first step in the assessment of the clinic is to look at past records and patient logs. The clinic does not keep extensive medical records for the average of 200 patient visits per day, but there is data available that is associated with the pharmacy. There will be time spent on deciphering the records with the ultimate goal of taking a random sample from each clinic day to gauge the load of malaria-related admits per month. After which, I will be doing more extensive data collection during the rest of the 8 weeks that I plan to be in Malawi. This will include continued sampling and observation of patients, but also distribution of a survey to assess patient education and use of prevention strategies. Collaborating with Drs. Maseko and Kessler, I will continue to discuss the best strategy for collecting survey data that is least invasive to patient flow. I will remain flexible to the method that works best after arriving at Pothawira and assessing the physical layout to maximize efficiency and privacy for survey participants.

The third stage is the consolidation and analysis time period. This will partially be completed in Malawi, and partially upon my return to the United States. The statistical and observational information collected at Pothawira will be entered and save electronically in excel which will facilitate basic analyses to graph and map frequencies and proportions of malaria-related outcomes. This format can be imported to more sophisticated statistical analysis software if more sophisticated analyses are required. This baseline data could be used to document utilization and need for materials such as quinine treatment and RDTs per month. It will also provide information on the outcomes of the efforts made by Global
Health Initiative and others at the Pothawira clinic to improve prevention and education for malaria in the surrounding villages. Experiences gained over the summer may even be used to help create future prevention and education outreach programs for the Salima area. KUMC is also in the process of building a relationship between the School of Medicine and Pothawira as a global health-training site, and my involvement at the clinic in Malawi can contribute to these efforts as well. After return to the US I will be gathering all of my information for my final Clendening report and plan to make any data collected or product completed available to KUMC.

**Timeline**

**February**
- Submit Clendening Proposal
- Begin Chichewa Instant Immersion Classes

**March**
- Solidify schedule
- Continue planning and preparation with Dr. Kessler
- Identify any vaccines or shots needed for travel to Malawi
- Make contact with Dr. Peter Maseko
- Purchase Airline Tickets
- Continue Chichewa classes

**April**
- Meet with Brad Gautney; learn medical practices at the clinic
- Continue gathering information on the clinic and malaria
- Solidify survey questions
- Continue Chichewa classes

**May**
- Continue Chichewa classes
- 22nd: Leave for Lilongwe, Malawi
- Week 1: Meet Maseko family, tour Pothawira, and get comfortable

**June**
- Help in Clinic and shadow patients and staff
- Find and study patient log
- Make necessary changes to survey and survey administration strategy
- Begin survey distribution and conversations

**July**
- Continue to help in clinic and shadow patients and staff
- Continued survey distribution, write-up of observations
- Interview Dr. Maseko about next steps to address clinic needs
- Explore surrounding villages
- 24th: Return to United States
- Collect and analyze data in aggregate form

**August**
- Continue analysis process with consultation from Dr. Kessler
- Prepare Write-up and presentation for Clendening Fellowship
IV. METHODS

The Pothawira clinic in Malawi is tied to research and staff at KUMC. My primary advisor/contact is Dr. Sarah Kessler who has traveled to the clinic multiple times. I plan to land in Lilongwe, Malawi on my date of arrival. From here Dr. Maseko will pick me up from the airport and provide transportation to Salima. While in Malawi I will be staying with Peter and Emma Maseko for about $25 a night. At the Maseko household, room and board will be provided, and I will be traveling with Dr. Peter Maseko to and from the clinic each day. Extra transportation around Malawi may not be necessary but is available.

In terms of IRB, I will be submitting a request for a determination of Not Human Subjects Research. My collection and presentation of data will be in aggregate form and each patient will be de-identified with no names or personal information. The primary purpose of the data collection is to improve services at Pothawira clinic and is not intended for publication.

V. BUDGET

<table>
<thead>
<tr>
<th>Item</th>
<th>Cost</th>
</tr>
</thead>
<tbody>
<tr>
<td>Round-trip Airfare</td>
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<td>- Kansas City to Lilongwe, Malawi</td>
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<tr>
<td>Room and Board w/ Dr. Peter Maseko</td>
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<td>Extra Necessities/Expenses</td>
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<tr>
<td><strong>Total</strong></td>
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<tr>
<td>Clendening Fellowship</td>
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<tr>
<td>Out-of-Pocket</td>
<td><strong>$1900</strong></td>
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</tbody>
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- In order to cover the out-of-pocket expenses my family has agreed to help in any way they can, but I am also prepared to take out a loan from my fall stipend to cover the extra expenses over the summer


