THE KRISTINA CHESTERMAN MEMORIAL CLINIC

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ABSTRACT

Kristina Chesterman, a 21-year-old nursing student, was riding her bike home from the library late on the evening of September 21, 2013, when she was hit by a drunk driver. Gravely injured and left alone by the side of the road when the driver fled the scene, Kristina survived her injuries long enough to become an organ donor, saving the lives of those who received her heart, liver, kidneys, and pancreas. Throughout her life Kristina was committed to helping others, and one of her plans was to travel to Africa to provide care for medically underserved populations. A multidisciplinary team has come together in her honor to establish the Kristina Chesterman Memorial Clinic (KCMC) in rural southeastern Nigeria. The purpose of the project is to establish a healthcare clinic that will honor Kristina's ambitions by improving access to medical care for the residents of Ozu Abam, Abia State, Nigeria, and the surrounding regions. The KCMC will focus its efforts on the provision of evidence-based healthcare for the patients it serves, as well as offering evidence-based education for American nursing students and Nigerian healthcare providers.

The focus of this Doctor of Nursing Practice project was the completion of the first phase of establishing the KCMC. The phase consisted of organizing the multidisciplinary implementation team, fundraising, and beginning the construction of the clinic. As a result of these activities, groundbreaking for the clinic took place in January 2015 and the clinic plans to open its doors to patients in January 2016, providing care for women, children and individuals suffering from diabetes mellitus.

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CHAPTER 1. EXECUTIVE SUMMARY

On September 24, 2013, the life of a 21-year-old nursing student from Northern California was cut short when she was killed by a drunk driver while riding her bike. This young soon-to be-nurse had a vision: she planned to begin her nursing career caring for those in Africa who lack access to adequate medical care and treatment. In honor of her memory, and in order to carry out the work she was unable to complete, a team of healthcare providers and nursing students from California have come together with a philanthropic civil engineer from Nigeria to build and dedicate a clinic in her honor. Due to the collaborative efforts of these dedicated individuals, the Kristina Chesterman Memorial Clinic (KCMC) will be built in Ozu Abam, Abia State, Nigeria, and will be completed by the year 2016. The proposed clinical focus of the facility was determined following a review of the literature, as well as through personal interviews with people who originate from Southeastern Nigeria. The research concurred with the anecdotal evidence and both clearly demonstrated that diabetes mellitus (DM) is a significant contributor to non-infectious mortality throughout Southeastern Nigeria. Additional research into healthcare issues in the region revealed that there is a need for an improvement in obstetrical and pediatric care. According to the literature, maternal-child death rates are high, due to inadequate training of care providers which leads to ineffective problem recognition and treatment during pregnancy, labor, and throughout the immediate postpartum period. The high death rate in children under five indicates that there is a need for vaccination programs and improved pediatric care. It was, therefore, determined the care provided at the KCMC will focus on women, children, and patients with DM, with the possible addition of further health services, including dental care,

ophthalmology, and general surgery, should it be determined that there is a need for these specialties. Ultimately, the goal of the KCMC project is threefold: (a) provide much needed healthcare for citizens of rural Nigeria, (b) provide student nurses with a global vision of nursing, and (c) provide a positive way for nursing students to cope with the death of their friend and classmate as they work to build a clinic that will be a lasting tribute to a young person with noble ambitions. The focus of this Doctor of Nursing Practice project was the first phase of establishing the KCMC including team formation and the accrual of the human and financial resources required to break ground on a healthcare clinic that will improve access to evidence-based medical care for the residents of Ozu Abam, Abia, Nigeria and its surrounding region.

CHAPTER 2. PROBLEM

Introduction

Despite the advancements in medicine that have occurred over the past century, healthcare issues remain a crucial social and political concern today, especially throughout the developing world. The World Health Organization (WHO), in their report titled "Global Health Risks: Mortality and Burden of Disease Attributable to Selected Major Risks," states that disease and injury can be prevented only after we have investigated and treated the underlying etiology of the specific health-related problems faced by a community. Furthermore, according to WHO, the two most effective methods for improving the health of a community are "targeting high-risk people, who are most likely to benefit from the intervention" and "targeting risk in the entire population, regardless of each individual's risk and potential benefit" (p. 1). It is the goal of the KCMC to engage in both identified methods of health promotion.

Throughout the developing world, women of childbearing age and children are an example of high-risk populations that are in need of evidence-based intervention. Each day, 800 women worldwide die from pregnancy and childbirth-related causes due to inadequate obstetrical care and 99% of those who do not survive pregnancy or childbirth reside in the developing world. Teens and women who live in impoverished, rural areas are at an increased risk for poor pregnancy outcomes versus adult women and women who live in urban environments. Although the obstetrical death rate has decreased significantly since 1990, women who reside in Sub-Saharan Africa have the greatest risk for dying due to childbirth-related causes (WHO, 2012). According to the United Nations International Children's Emergency Fund (UNICEF) (n.d.), "Every single day, Nigeria

loses about 2,300 under-five year olds and 145 women of childbearing age. This makes the country the second largest contributor to the under–five and maternal mortality rate in the world" (para. 1).

In addition to infectious causes of maternal/child mortality, including malaria and AIDS, the pregnancy-related hypertensive disorders of pre-eclampsia and eclampsia, along with post-partum hemorrhage and puerperal sepsis, account for the majority of maternal deaths; unfortunately, these conditions are highly preventable or curable with adequate provider knowledge as to evidence-based practice. It is due to the high number of preventable deaths that improving maternal health is one of the eight millennial development goals established by WHO in 2000 to improve the health of the international community. Also impacted by the lack of adequate prenatal and postpartum care are the unborn babies and neonates. Statistically there are approximately 2.6 million stillbirths and 3 million neonatal deaths each year in the developing world (WHO, 2012). The evidence is clear that the provision of expanded medical services is the only way to preserve maternal/child life in impoverished nations such as Nigeria. According to WHO (2012),

> Most maternal deaths are avoidable, as the healthcare solutions to prevent or manage complications are well known. All women need access to antenatal care in pregnancy, skilled care during childbirth, and care and support in the weeks after childbirth. It is particularly important that all births are attended by skilled health professionals, as timely management and treatment can make the difference between life and death. (para. 13)

Therefore, it can be extrapolated from the evidence that in order to best serve the needs of the community, any clinic built in rural Nigeria must include maternal/child health services.

Other significant health problems that have been identified by WHO (2009) as contributing to a low-life expectancy are those of obesity, hypertension, and DM. As healthcare improves and fewer people die from infectious causes, the population begins to suffer from diseases that are non-infectious, making education as to wellness and preventative healthcare integral to preserving the well-being of a community. Because there is a known genetic component as well as a behavioral risk associated with DM, and because DM is associated with significant morbidity and mortality, providing care related to the chronic disease is an important example of "targeting risk in the entire population" (WHO, p. 1). Due to the western lifestyle (which includes a combination of the ingestion of high fat, high salt, low nutritional density foods, and decreased daily activity) making its way throughout the world, obesity rates are climbing globally and there are an estimated 1 billion overweight people and approximately 300 million obese people in the world today (WHO).

Abdominal obesity and hypertension, two primary components of metabolic syndrome, are clearly linked to DM in the literature, and, due to the increasingly large number of people who carry excess abdominal weight, the rate of hyperglycemic disorders is on the rise internationally. High body mass index is especially associated with a low-life expectancy in the developing world as "in … Africa, 41% of deaths caused by high body mass index occur under age 60, compared with 18% in high-income countries" (WHO, p. 18). Additionally, "44% of the diabetes burden, 23% of the ischemic heart disease burden, and 7-41% of certain cancer burdens are attributable to overweight and obesity" (WHO, p. 18), making it paramount that lifestyle education, along with DM care and prevention instruction, be a part of healthcare in Nigeria, a

nation where 6 million people are currently living with DM (World Diabetes Foundation, n.d.).

Statement of the Problem

The problem that is being addressed by this DNP project is the lack of adequate medical services currently available for the residents of Ozu Abam, a rural community located in the Abia State of Nigeria, and the resulting high rates of preventable deaths and increased morbidities associated with acute and chronic diseases within the community. The KCMC project is designed as a multi-phase plan that involves working with the Nigerian community and U.S. volunteers to establish a medical clinic that will be staffed by volunteer personnel who are trained in evidence-based clinical practice. The expected outcome of this effort is a reduction in preventable deaths and prevention of morbidities associated with chronic and acute diseases in this region of Nigeria. Phase 1, clinic construction, is the focus of this DNP project.

Setting

The Federal Republic of Nigeria is located at 10.0000 degrees north and 8.0000 degrees east and sits on the western coast of the African continent, entirely within the tropical zone. It is a federal constitutional republic that is made up of 36 states spread out over 923,768 square miles and is the most populous nation on the African Continent (Maps of World, n.d.). Although English is the official language, many Nigerians are bi- or multi-lingual, speaking English in addition to one or more of their 400 native languages (Federal Republic of Nigeria, n.d.).

According to the Executive Director and Chief Executive Officer of the National Primary Heathcare Development Agency (NPHCDA), Dr. Ado Jimada Gana

Mohammed, there are many issues regarding healthcare in the nation where 1 million children under the age of five die each year of preventable diseases. A study by Johns Hopkins University and presented by McNamara (2013) "predicted that a 90% coverage rate for vaccines would … save more than 600,000 lives" (para. 7). One of the reasons cited by Mohammed for the lack of vaccination is the inability to keep the vaccine refrigerated since rural areas are not connected to the power grid and often do not have consistent power for refrigeration. In addition to the lack of ability to properly handle the vaccine serum, the nation is also short of healthcare providers to administer injections to the children. Although the Nigerian government is working diligently to improve the health of their citizens, the current life expectancy of a Nigerian is 52.05 years for the entire population, broken down into 48.95 years for males and 55.33 years for females, and the median age of the population is 17.9 years (indexmundi, 2013).

A survey from 2008 looking at demographics and healthcare in the nation indicated that access to healthcare is a significant problem for the Nigerian people. The leading barrier to seeking healthcare, according to female respondents, was financial, with 56% of women surveyed saying they lacked the money needed for care. Forty-one percent of women surveyed cited a fear that no medication would be available for them at the nearest healthcare facility and one-third of respondents stated that they either had to travel too far to reach a clinic or that there were often no available providers if they did manage to get to a healthcare facility. Other identified issues included no female provider available, fear of traveling alone, and issues regarding receiving permission to travel for treatment (National Population Commission Federal Republic of Nigeria, 2009). It is

clear that there is a need for additional medical care and resources throughout the country and the need for access to healthcare in Ozu Abam, Abia State, Nigeria, is great.

The city nearest to Ozu Abam is Umuahia, the capital of Abia State, which is located in Southeastern Nigeria (Figure 1). The town of Umahia is an agricultural center, which is located on the railroad line and serves as a collecting point for many Nigerian crops. The city has a population of 359,230 people who, much like the residents of Ozu Abam, are primarily of the Igbo ethnic group (Umuahia, 2013). Ajunwa (2013) stated, "With pervasive poverty, a novel idea is to help the indigent of society work together through savings groups and a support programme is helping to get lives back on track in Abia State" (para. 1). Mercy Orji, the First Lady of Abia, when discussing the abject poverty of her constituents, stated that she is dedicated to helping the poor by providing them with the tools they need to turn their lives around. It is in keeping with the vision of

Figure 1. Region to be served by KCMC.

Ms. Orji that a clinic will be built to increase the provision of primary medical care to the rural citizens of this impoverished region of the country.

The visionary behind the project is James Umekwe, a Nigerian-born civil engineer who immigrated to the United States (U.S.) and has dedicated himself to providing needed healthcare for the Nigerian people. Umekwe was inspired to help his Nigerian community through the creation of a medical clinic following the deaths of his aunt and father—deaths that could have been prevented had they had access to appropriate medical care and treatment. He was moved to embark upon his philanthropic journey when he realized that every day in Nigeria the lack of access to healthcare was leading to a large number of preventable deaths. Umekwe's dream became a reality on December 31, 2012, when the doors to his first clinic, Upon This Rock Medical Center, opened in Ozu Abam, Abia State, Nigeria. This pioneering clinic is staffed by a physician, nurses, and support staff who care for the impoverished people who reside in Abia State, as well as healthcare providers from the U.S. who come to the clinic twice a year to provide high-level medical treatment and surgical services. The success of this clinic encouraged him to expand his vision and he began to dream of a second clinic to be located on land he owns that is adjacent the existing clinic. It is on this land that the KCMC will be built, greatly expanding the healthcare provided to those in need who often come to the clinic in numbers so great that many wait all day for the opportunity to receive healthcare (Figure 2).

Conceptual Framework

According to Mock et al. (2007), "Researchers use conceptual models or theoretical frameworks to provide an organizing structure for their studies, to guide the development and testing of hypotheses, and to place research finding within the context of science. Selection of an appropriate and useful framework is an essential step in the

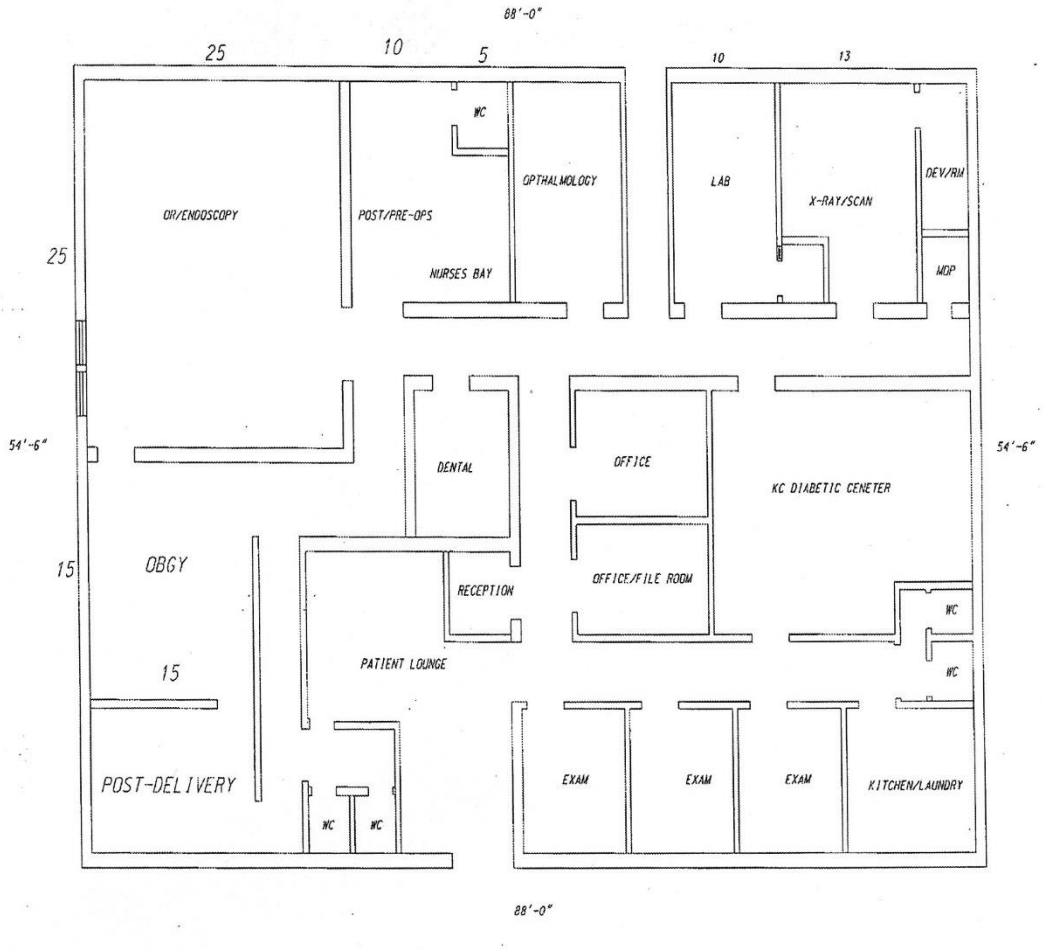


Figure 2. Proposed floor plan for phase 1 KCMC.

development of a research project" (p. 503). Choosing a conceptual model is important because it not only provides a starting point for a project but it also enables those associated with a specific venture to identify a clear direction and vision for themselves (Nalzaro, 2012). Since there is no exact definition for an evidence-based practice (EBP) project (Children's Services Council, 2007), there are many different conceptual frameworks from which to choose and the developers of an EBP project must be vigilant in ensuring that they choose the framework that will provide them with the clearest possible direction. The Logic Model (LM) was chosen for the KCMC project because it is known to be effective in the design of a plan that is intended to make a change within a

community. It is also an effective framework when a project involves a large number of participants because the (LM) provides the aforementioned clear direction as well as "… a common language and point of reference" (Work Group for Community Health and Development at the University of Kansas, 2013, para. 2). Because the KCMC involves a large number of team members who reside in different regions of California, as well as in Maryland and in Abia State, Nigeria, it was crucial that the chosen framework provide a plan that was clear and easy to follow and it was determined that LM was the framework that would best provide all of the necessary elements required for a successful project.

Essentially an action plan, LM was developed more than 20 years ago as a way to evaluate program performance. Since its inception it has gained applicability and it is now also commonly used for program development. When chosen as a conceptual framework, LM can be useful in the identification of the critical performance elements of a project and its use will effectively enable project planners to "link the problem (situation) to the intervention (… inputs and outputs), and the impact (outcome)" (McCawley, n.d., p. 1).

Another strength of this framework is the ability for the outcomes of one project to become the input for the next, enabling a large project to be completed in phases. Outcomes, as defined within the context of the model, can be short, intermediate, or long-term and are based on what the project planners want to have happen. Defining a clear outcome is crucial in the communication of the project goal to the team, as well as to outsiders who might need to understand the "impact of the investment" (McCawley, p. 4). During this step in the process it is important to consider the desired impact, what

success will look like, and what needs to happen or change to achieve the desired outcome.

Also important to consider is the education or training that will be needed and how the necessary information or skills will be provided. The final consideration during this phase is the determination as to what money or other resources will be needed to successfully complete the project. Once the outcome has been determined, project planners can then begin to look at the other elements, including "inputs" and "outputs."

Inputs are defined within LM as the investments that are provided to the project. Inputs often include human attributes, including "knowledge, skills or expertise" (McCawley, n.d. p. 3). The inputs can convey strength of the program to those on the outside if they are of high quality and are described clearly in the project plan. Involving government agencies as collaborators, providing clear information as to the available funding, and plainly describing the needed skills and knowledge for the program all serve to help improve the program's credibility (McCawley).

Outputs are defined by LM as what the program will provide to others, as well as who the recipients of the program or services will be. The description of the expected outputs enables project planners to connect the dots between the identified problem or situation and the anticipated outcomes. Outputs include both what the program was designed to accomplish and the people who have been impacted (McCawley). The activities step enables project planners to define the interventions in which they will need to engage in order to bridge the gap between inputs and the desired outputs and outcomes. LM was chosen for this project because it is effective in providing clear communication as to the rationale for a project, information as to the elements required

for the project, and the projected order in which interventions are expected to occur. It is also effective with any project that will require assessment or evaluation upon completion (McCawley).

Because the KCMC is expected to be completed in phases, with phase 1 slated for completion by May of 2015, LM also offers team members the opportunity to use the outcomes from this phase to begin the next. It also offers project planners the ability to expand upon the plan as the project moves forward, adding specificity to the identified inputs, activities, outputs, and outcomes. See Figure 3 for the diagram of the KCMC logic model.

Literature Synthesis

A review of the literature was conducted during the early planning phase to determine the greatest health issues faced by those who reside in Abia State, Nigeria. Electronic searches were conducted using PubMed, CINHAL, Cochrane Library, Science Direct, and Academic Search. The initial search was performed using the terms "mortality and Nigeria and medical care" and "mortality and Nigeria and healthcare." Based upon the results of the first search, a secondary search was done using the terms "Abia, Nigeria and healthcare." The articles located through the first two searches led to a tertiary search in which the terms "Nigeria and women's health," "Nigeria and diabetes" and "Nigeria and women's health and diabetes" were utilized. Articles considered for the preliminary search and synthesis were written in English and studies in which the full article was not available were excluded from the initial review.

In total, 26 articles representing studies and reviews published between 2005 and 2013 were ranked for level of evidence and synthesized to determine the appropriate

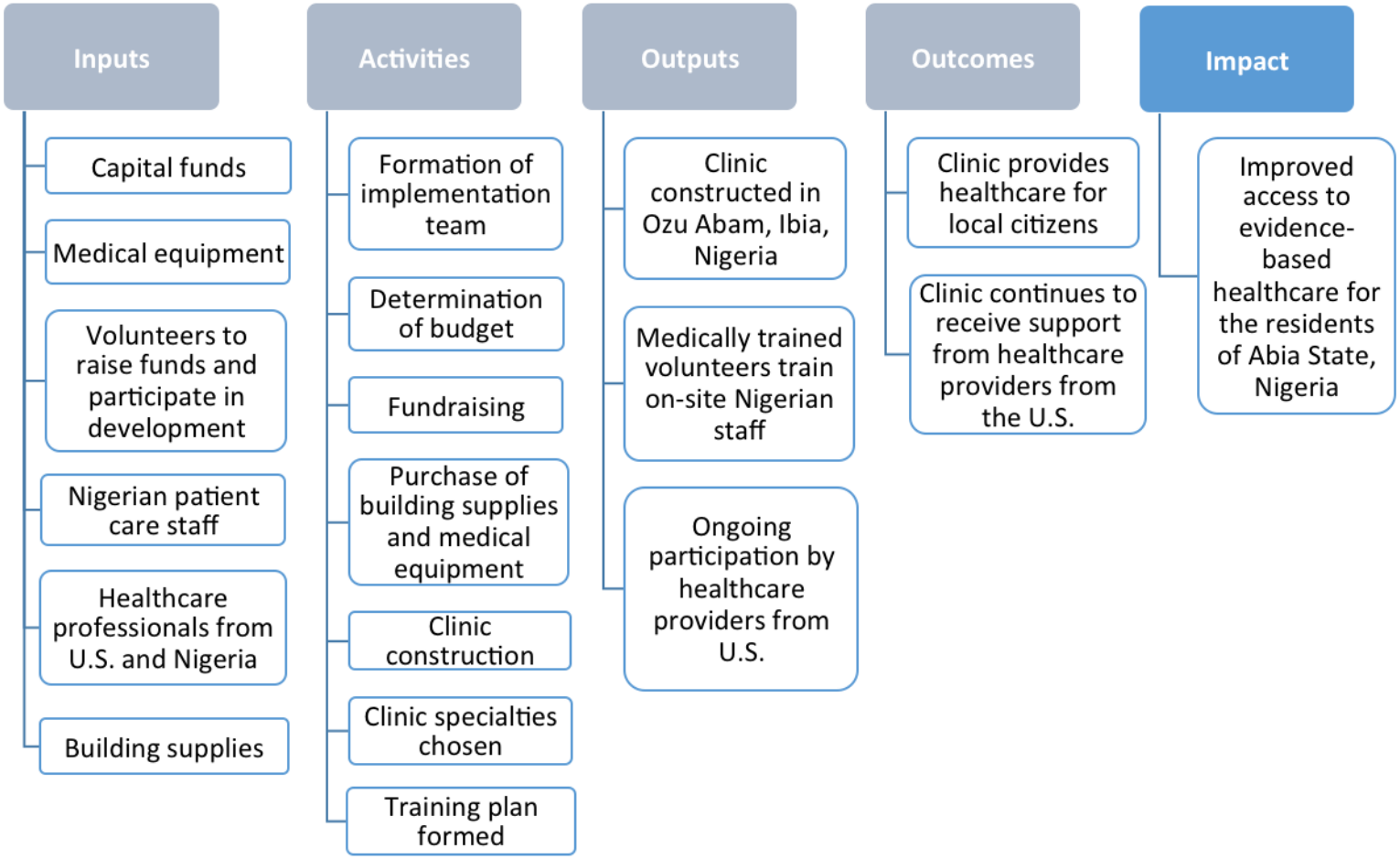


Figure 3. KCMC logic model.

focus of the clinic. All relevant articles were critiqued using the Mosby's Research Tool and the level of evidence was ranked per the Mosby criteria (Table 1). The majority of articles reviewed were descriptive studies and were ranked at level 6. There was one quasi-experimental survey which was ranked at level 3, one study was a longitudinal, prospective cohort study and was ranked at level 4, and five studies were ranked "other" as they included systematic reviews of literature or existing data.

The goals of the literature review were three-fold. First, the review set out to determine the healthcare needs of the residents in the area. Second, the review set out to determine cultural beliefs and attitudes that would impact the delivery of healthcare.

Table 1

Mosby's Level of Evidence

Level of evidence	Description
I	Meta-analysis
II	Experimental or randomized control Trial
III	Quasi-experimental
IV	Case-controlled study Cohort study Longitudinal study
V	Correlation study
VI	Descriptive study (survey, cross-sectional design, developmental design, qualitative study)
VII	Authority opinion or expert committee report
Other	Review of literature Performance improvement

Third, the review was designed to determine gaps in the knowledge of healthcare workers from the region to determine what training is needed to ensure that patients of the clinic will receive care that is consistently evidence based. All articles located during the search

dealt directly with healthcare issues in Nigeria, although some of the data came from regions other than Abia State, the proposed location of the clinic. This was a weakness of the search since there is a great deal of ethnic diversity throughout the nation, with 371 known tribes living throughout the country, some tribes are found in more than one region (Tribes in Nigeria, 2013), and cultural practices vary widely between the different ethnic groups.

The primary consideration when proposing a healthcare center in another country is that of the health-seeking behaviors of those in the region. It is important to first understand the local healthcare attitudes and needs since a clinic will not be successful if those it is there to serve do not avail themselves of the treatments and education provided. Two applicable studies were found in the literature search which offered insight into the cultural health-seeking behaviors of the residents of Nigeria.

Garba, Hellandendu, and Awogbade (2008) published a descriptive survey in which a questionnaire was sent to 231 households in Niger State, Nigeria. The researchers found that within the surveyed community, 65.8% relied upon traditional medicine and only 34.2% sought out western medicine when they were in need of healthcare. Additionally, it was demonstrated that in the Niger region, the head of household is responsible for the decision to seek help for sick family members. This study may be limited in its application to the clinic as it was focused on Niger State, located in Northern Nigeria, which is predominantly Muslim and it is probable that the patriarchal beliefs of those who practice Islam were central to their identified health-seeking behaviors. The KCMC will be built in Southeastern Nigeria, which has a highly

Christian population, so it is likely that this study has limited applicability to the population of interest.

Another study, more directly applicable to the clinic's development, considered health-seeking behaviors of Igbo women, members the tribe most commonly found in Abia State. In many areas of the country, Nigerians have limited access to healthcare and often traditional medicine is the only option available when they need to care for a sick family member. The study looked specifically at Igbo people who left their own cultural region to seek help from the healers from a different tribe, the Ibibio. The researchers used a qualitative study design to ascertain the rationale behind a change in cultural healing practices and found, through the interview process, that there were three main reasons Igbo people sought healthcare away from their home community: a failure of treatment from their own community, a need for secrecy or privacy regarding the chosen therapy, and the need for secrecy regarding the illness itself. This study has implications for the KCMC as it demonstrates the continued traditional belief of the Igbo community that illness often occurs secondary to spiritual transgression.

The research also provides evidence that there are disease processes which, based upon traditional belief systems, can cause Igbo individuals to become isolated from their community and those diseases are, therefore, associated with a reluctance to seek local treatment. It will be important, as it is in the United States, that confidentiality be a primary focus of the clinic. It will also be important that care providers show respect for traditional cures and that they understand the emotional ties the community has to their traditional beliefs and practices so that they may easily enter into a therapeutic relationship with individuals who are in need of healthcare.

The initial web-based search to identify specific healthcare needs in Nigeria found that the average life span in the country was 52 years, causing Nigeria to receive a life expectancy ranking of 17th-lowest in the world (Okpi, 2013; World Bank, 2011). Based upon this knowledge, the literature review set out to determine the primary etiology of the low-life expectancy of the Nigerian people.

Doctor (2013) performed a review of existing information to determine the cause of poor maternal and child health indicators in the nation. Upon his evaluation of data, which was obtained from the Multiple Indicator Cluster Survey (MICS), as well as the Demographic and Health Survey (DHS), the two primary sources for national mortality data, Doctor found that the methods used by the two studies differ greatly in their estimation techniques which leads to questionable and often variable data being collected and reported. One identified reason for the variance of reports is the use of indirect data collection by the MICS being used alongside the more direct data collection methods of the DHS. Ultimately, Doctor's review of the statistics showed that there is a need for more consistent research into the causes of maternal and child mortality so that the healthcare community can respond properly. This study was limited due to its reliance upon existing data, however, it indicated that the nationally reported morbidity and mortality statistics from Nigeria are questionable due to inconsistent collection methods and a dependence upon self-reported data.

Maternal mortality being an area of interest for clinic services, six studies were located that directly explored the issue of pregnancy and delivery-related complications. The studies by Ozumba and Nwogu-Ikojo (2008) and Garba, Ajaya, Ias, Umar, and Onubanjo (2004) indicated that maternal mortality in the region, as previously discussed,

is largely preventable and is often due to a lack of prenatal care which results from having limited access to trained obstetrical healthcare providers. Morbidity and mortality associated with pregnancy and delivery are also linked in the reviewed literature to a lack of provider training and a subsequent delay in the realization that a high-risk pregnancy-related condition is present. Although neither of these studies was conducted in the region of the clinic, the Igbo people, who are the primary inhabitants of Abia State, also reside in Enugu (Tribes in Nigeria, 2013), the location of the study, helping validate the applicability of the findings to the population which will be served by the clinic.

A deeper look into the reason behind low participation in prenatal care by women in Southeastern Nigeria found research by Rai, Singh and Singh (2012) and Onah, Ikeako and Iloabachie (2006) which indicate that the primary barriers to women's participation in pregnancy care are often either social or economic. The clinic will need to be cognizant of the necessity to work through these issues to improve maternal outcomes since, even in areas with available maternity services, the research showed that women's participation in prenatal care was low. Onah et al. found that the overall perception of perinatal care providers by Nigerian women was negative and many women described the providers as "unfriendly and uncompassionate" (p. 1875). They also found that economic barriers existed, especially in rural settings, and poorly trained lay midwives who were willing to deliver care for trade rather than money were the primary care providers for women who lacked financial resources.

A lack of resources was also associated in the literature with limited birth control availability, and high parity was one of the issues associated with the maternal mortality. In concurrence with the identified need to improve participation in prenatal care that was

demonstrated by Rai et al. and Onah et al., a study by Iyoke, Ugwu, Ezugwu, Lawani, and Onyebuchi (2013) found that obesity during pregnancy was directly associated with maternal morbidity and mortality. The researchers found that women who enter pregnancy with a high body mass index (BMI) were at increased risk for a number of poor fetomaternal outcomes, including premature rupture of membranes, preeclampsia, gestational diabetes, and hemorrhage and therefore, due to the limited resources in the community, women and babies would have better outcomes if antepartum care was provided by well trained, educated providers. The evidence indicates that, in order to alter maternal mortality rates, there will need to be changes in the way obstetrical healthcare is delivered in Nigeria.

In addition to loss of women's lives due to the limited availability of prenatal care, Friday et al. (2012) found that another cause of perinatal morbidity and mortality is related to inconsistent and often inadequate infection control practices among maternal care providers. Lack of infection control policies and ineffective provider training related to infection prevention practices were found to be associated with a high rate of maternal infection and puerperal sepsis in southern Nigeria. This discovery led researchers to the conclusion that policy development and staff training are needed to protect women from intrapartum and postpartum infection.

The review of literature related to preventable maternal mortality rates in Nigeria clearly established that it will be important to the health of the community that the KCMC offers women's healthcare as a primary focus of the medical center. The research demonstrated that cultural barriers are directly implicated in the low rate of prenatal care in the region. It was also well demonstrated that healthcare providers who endeavor to

provide Nigerian women with care and education related to childbirth and reproduction must be aware of each woman's attitudes toward healthcare and healthcare professionals to assuage any of their patient's concerns. Additionally, women's health must encompass more than care related to pregnancy; women will remain healthier if they receive culturally sensitive education and care outside of pregnancy as well.

In an attempt to better understand the reaction of Nigerian women to gynecologic procedures, Chigbu and Aniebue (2012) surveyed 409 women who attended colposcopy clinics in Enugu State. The study utilized a four-point Likert scale to determine satisfaction with the procedure and focused on provider proficiency, privacy, positioning, discomfort, education, ability to ask questions, and overall friendliness of the clinic staff. Researchers found that clinic clients were more satisfied if the staff were perceived as reassuring and their spouse was present during the procedure. Female care providers were preferred by 83.3% of those who responded to the survey. The primary dissatisfier was the loss of privacy associated with the procedure. The information obtained by these researchers can be used to assist the staff of the KCMC as they set up a clinic that will be focused, in part, on women's healthcare due to known women's health issues including a high maternal mortality rate of 560 deaths for every 100,000 births in the nation (World Bank, 2015a). Although based on a specific procedure, this study provides insight into women's perceptions of gynecologic care that can be easily applied to general women's healthcare and obstetrical procedures. The provision of privacy will be paramount, as well as designing rooms that are set up to enable the woman's spouse to be present for all gynecologic and obstetric visits, and a concerted effort will be made to provide women with female care providers whenever feasible.

Another notable health concern that is impacting the wellness of the Nigerian community is that of metabolic syndrome and the resulting occurrence of DM and hypertensive disorders. Anecdotal information regarding these issues was obtained through discussion with Nigerian-born American healthcare providers and research was undertaken to verify the need for the clinic to focus on these healthcare concerns.

Chukwuonye, Chuku, Okpechi, et al. (2013) found that obesity was prevalent throughout all income groups in the region, with the greatest amount found in those of higher income levels. The reason for obesity in higher income people was explained as being due to the status associated with being able to afford to eat better food, as well as their decreased activity level when compared to those in lower income brackets.

Another study by Chukwuonye, Chuku, Onyeonoro, et al. (2013) looked at the number of Nigerians in Abia State who suffer from abdominal obesity. The sample involved 2,807 individuals and researchers found that 39.2% of women in the population studied suffered from abdominal obesity, compared to 3.2% of the men in the research group.

According to research done in South Africa by Goedecke, Forbes, and Stein (2013), black women who were of a lower socioeconomic status or suffered from sexual trauma were more likely to suffer overweight than white women, indicating that the clinic will need to offer holistic care practices for those who are of low income or have suffered physical or psychological trauma. Because the evidence is clear that abdominal obesity is closely linked to DM, as well as cardiovascular disease and hypertension, it is apparent that healthcare clinics in Abia State must include diet and exercise education, as well as

providing close monitoring of cholesterol and lipid levels, blood glucose levels, and blood pressure, especially for those who suffer from visceral adiposity.

Looking into the cardiovascular risk factors in the Abia State population, Okpechi et al. (2013) published a cross sectional survey in which they collected data regarding blood pressure, anthropometric measurements, fasting cholesterol, and blood glucose from 2,983 male and female adult participants. They found that there was a significant need to intervene to reduce the primary preventable risk factors for non-communicable diseases which were identified as hypertension (31.4%), physical inactivity (64.2%), and overweight or obesity (33.7%). Based on this evidence, it will be necessary for the KCMC to provide care and treatment for patients who suffer from cardiovascular disease or are at risk for sequelae related to obesity.

A chronic disease often linked to metabolic syndrome and cardiovascular disease, DM is a condition that is becoming common throughout Nigeria and its prevalence in the southeast portion of the country is high. Because DM is associated with high morbidity and mortality, DM education and treatment will also be a primary focus of the KCMC. Considerations with regard to setting up a clinic in order to provide DM care must revolve around the attitudes and educational needs of the staff, in addition to the needs of the patients.

Mohan, Seedat, and Pradeepa (2013) found that the coexistence of hypertension and DM in developing countries has become a burden on the limited healthcare resources and it is imperative that primary healthcare clinics incorporate medical care that is designed to provide early diagnosis and treatment of both DM and hypertension. In order

for the needed care to be provided, healthcare professionals must be well schooled on the diagnosis and treatment of these chronic and potentially debilitating conditions.

Similar results were obtained by Unachukwu, Chioma and Ofori (2012). Ogbera, Adeyeye, Odeniyi, and Adeleye (2013) published a cross-sectional study which looked at healthcare providers who cared specifically for patients with tuberculosis (TB) and considered their knowledge as to the diagnosis and treatment of DM, and their knowledge related to TB. The study found that the providers surveyed lacked knowledge regarding the care for patients with DM, especially with regard to non-pharmacologic management of blood glucose levels. The TB study had limitations as it solely considered healthcare workers who worked in TB clinics in Lagos State. The lack of knowledge in the population studied may be directly due to their focus on TB care and, therefore, may not be applicable to healthcare providers in other specialties. No other studies focusing on healthcare-provider knowledge were considered during the literature review.

Treatment of DM and cardiovascular disease often involves the use of medications when lifestyle changes are found to be ineffective. The efficacy of these treatments and the compliance of the patients in the region are important considerations for providers in a new clinic. Adisa and Fakeye (2013) considered the influence of the number and type of hypoglycemic medications on compliance with treatment. Their study focused on patients with type 2 DM who resided in Southeastern Nigeria. The research indicated that patients who were taking four or more prescriptions were more compliant with treatment and had greater glycemic control than those taking fewer medications. Age and educational background were also found to be integral in adherence to treatment as those on multiple medications were more often older and better

educated than those taking fewer drugs. This study will assist staff of the KCMC clinic to determine appropriate treatment options for patients based on their personal needs and ability to comply with treatment.

Okeoghene and Alfred (2013) also looked at medications used in DM; however, the focus of their study was Simvastatin, a lipid lowering medication. According to their research, 15% of those who die from DM-related causes in Nigeria succumb to cardiovascular events, therefore, the authors of the study were focused on the use of this medication's ability to decrease the risk of death from to cardiovascular disease. The study found that participants tolerated the medication well, the medication successfully treated lipid abnormalities, and those taking the medication had a correction of LDL-C, as well as improvements in their other lipid profiles.

Associated with cellular and organ damage, DM is an insidious disease that impacts the body in many ways, although, at times, the patient is asymptomatic. Studies as to the DM-related problems faced by the patient population served by the clinic were reviewed to determine the appropriate educational focus. As with all populations who suffer from DM, research showed that those in Nigeria commonly suffered from retinopathy (Askira & Mubi, 2012) and neuropathy (Ebenso, Fuzikawa, Melchior, Wexler, & Piefer, 2007). Depression was found to be a significant co-morbid condition, in both the elderly population (Gureje, Ademola, & Olley, 2008) and in adults between the ages of 20 and 64 (James, Morakinyo, Eze, Lawani & Omoaregba, 2010) Hyperglycemic Hyperosmolar Non-Ketotic syndrome (HHNK) was found by Ezeani, Eregie, and Ogendengbe (2013) to be the most common type of hyperglycemic emergency seen in the emergency department of the Federal Medical Centre in Umuahia,

the city nearest to the KCMC site, and HHNK was also identified as the hyperglycemic disorder with the highest morbidity and mortality in the region.

These studies all provide necessary information and focus for the clinic's development of a DM education program. Ebenso et al. (2007) developed a questionnaire which can be utilized by clinic staff to screen clients with DM-related neuropathy. Their "Screening of Activity Limitation and Safety Awareness" questionnaire takes ten minutes to administer and provides healthcare providers with a way to measure activity limitations that are related to peripheral neuropathy. The scale will be useful in the identification of those who require referral to specialists for development of treatment plans.

The final patient-care population that will be a focus of the KCMC is the pediatric population due to the aforementioned estimated loss of 2,300 children under the age of 5 in Nigeria every day (UNICEF, n.d.). When caring for children, it is necessary for healthcare providers to remain cognizant that family-centered care is integral to treatment success. Dipo, Wakili and Asekun-Olarinmoye (2011) found that children who were hospitalized secondary to malnutrition recovered more quickly when their mothers received nutrition education and counseling. This study is clearly applicable to clinic practice and education for parents will be a primary focus of all pediatric appointments.

Home visits are another way to successfully treat children and adolescents, as demonstrated by research performed by Ouduwole, Uko, Tade, Doherty, Nwodo, and Imafidon (2011). Although type 2 DM is the predominant form in the region, this study focused on the effect of home visits for young patients with type 1 DM. Researchers found that children who received healthcare visits outside of the clinic had improved

clinic attendance, enjoyed a decrease in blood sugar abnormalities while at school, and demonstrated increased compliance with blood-glucose testing. Hemoglobin A1C levels in those who received home care decreased from an average of 12.86 % to 9.41%. Although this study exclusively considered the impact of home visits on type 1 DM, it can be extrapolated that young patients respond well to out-of-clinic intervention and it may be warranted to incorporate home and school visits into all services offered by the KCMC clinic for those with chronic illness of any kind, especially since many people who will be served by the clinic are low income and are likely to have a limited ability to travel to the clinic on a regular basis.

The initial review of the literature provided the KCMC clinic development team with the information needed to form an evidence-based plan for the care that will be provided. Based upon evidence in the literature, it is apparent that, in order to impact overall morbidity and mortality in the region, the focus of the clinic must be on women's health, children's health, and DM education. A further review of the literature will be conducted to ensure that appropriate resources are allocated in order to meet the primary healthcare needs of the residents of Ozu Abam, Abia State, Nigeria.

Summary

It was demonstrated consistently in the literature that the Nigerian people suffer from a low-life expectancy due to a high incidence of infectious and non-infectious disease, combined with a lack of access to healthcare. The research done clearly showed that maternal mortality in the region is often related to a lack of knowledge on the part of healthcare providers, which often leads to a delay in the recognition and treatment of high-risk pregnancy conditions. It was also demonstrated in the literature that maternal

mortality related to puerperal sepsis is greater in Nigeria than it is in the developed world, which may be attributed to a lack of infection prevention practices by local healthcare providers. Inadequate hand washing and breaks in sterile technique were found to occur due to a lack of running water and inadequate access to needed supplies. Additionally, further research confirmed that trauma, especially that of a sexual nature, and the westernization of the Nigerian diet and lifestyle were directly implicated in the rise of obesity, DM, and hypertension among the Nigerian people (Anderson et al., 2011). The body of evidence clearly indicated that there is great need for both acute maternal child care and DM-related care in Nigeria, and the development of a clinic to meet those needs continues to be the goal of the KCMC implementation team.

Identified weaknesses of the literature search included that only those studies which were written in English were considered. Another significant weakness was that the search excluded literature in which the full article was not readily available. Additionally, some studies that were used had questionable applicability to the population served by the clinic due to regional, ethnic, and religious differences between the projected clinic patients and the people who participated in the study. The lack of level I and level II studies (as defined by Mosby) is also a weakness, although it was not surprising to find mostly descriptive studies and secondary sources that were related to the area of interest. As the project moves forward, an inclusion of additional literature will be necessary to ensure that the care provided by the clinic is well designed to meet the needs of the community it serves.

There were many identified gaps during the review since it is still in process and the literature has not yet been exhausted. Further areas of consideration before the clinic

is built include additional research into health behaviors in the region, including the availability and cost of healthy food and the foods that are commonly consumed by residents in the region. Additionally, more information is needed with regard to maternal morbidity and mortality and current educational requirements for Nigerian healthcare professionals.

Based on the consistency of the literature reviewed thus far, the clinic will move forward with the plan to focus care on women, children, and patients with DM. The objective of the clinic developers is to build a clinic that will have a positive impact both locally and internationally, and the development of the KCMC will benefit those who are on the implementation team and those who will receive healthcare services. Ultimately, it is the intention of the clinic's implementation team that they honor the memory of an extraordinary person, expand the American nursing student viewpoint to a more global vision, and, most importantly, that the clinic provide evidence-based care to a population in need.

CHAPTER 3. METHODOLOGY

Kristina Chesterman believed that it is the job of all who are privileged to "pay it forward." Her personal conviction that we are all responsible to help others led to her desire to work as a nurse in areas where residents lack access to healthcare. Inspired by her passion and her idealism, a team of American students and healthcare professionals have come together to ensure that her dream to help others is realized through the creation of the Kristina Chesterman Memorial Clinic to be located in the rural community of Ozu Abam, Nigeria. This chapter outlines the clinic's implementation plans and data collection methods.

A review of the literature clearly demonstrated that the residents of Nigeria lack access to healthcare, leading to a high mortality rate secondary to infectious and chronic diseases (Okpi, 2013; World Bank, 2011). Additionally, the literature shows that women, children, and those with DM who live in the country are at especially high risk for morbidity and mortality due to the lack of access to trained healthcare providers (Doctor, 2013); Garba, Ajayi, et al., 2008; Ozumba &Nwogu-Ikojo, 2008). With the ratio of physicians to patients in the nation standing at 1:3500, a number well below the World Health Organization standard of 1 physician for every 600 people (Agabi & Leo, 2012), it is clear that there is a need for enhanced medical care and additional provider training. The ability to receive evidence-based care from trained providers is crucial to the improvement of the health of the Nigerian people, and it is the goal of the KCMC to provide said care for women, children, and individuals with DM who reside in rural Abia State, Nigeria. The clinic will also endeavor to provide evidence-based education for

local professional and lay healthcare providers in the region to improve the availability of evidence-based healthcare for Nigerian patients.

PICO

- *Patient and problem:* The residents of Ozu Abam, Abia, Nigeria and the surrounding region who lack adequate access to healthcare in the disciplines of women's health, pediatrics and DM care.
- *Intervention*: Increase the availability of healthcare resources for women, children, and those with DM through provision of care and the training of local healthcare providers.
- *Comparison*: Current healthcare resources.
- *Outcome*: An increased number Nigerian women, children, and patients with DM who receive evidence-based healthcare.

Purpose Statement

The purpose of the project is to establish a healthcare clinic that will improve access to medical care for the residents of Ozu Abam, Abia, Nigeria, and its surrounding region, with an emphasis on providing evidence-based care for women, children, and those with DM and training for Nigerian healthcare providers.

Definitions

- *Patient*: A person or persons who receive medical care at the KCMC.
- *Healthcare provider*: Physician, registered nurse, or other healthcare professional who is licensed or certified in a medical specialty.
- *Healthcare*: "The maintaining and restoration of health by the treatment and prevention of disease especially by trained and licensed professionals (as in medicine, dentistry, clinical psychology, and public health)" (Merriam-Webster, 2014, para. 1).

- *Patient satisfaction*: The rating by a patient as to his or her happiness or displeasure with services received from a healthcare provider.
- *Pre-test*: A test administered prior to a learning event to determine baseline knowledge.
- *Post-test*: A test administered following a learning event to determine if the transfer of knowledge was successful.
- *Strategic plan*: The process by which an organization defines its strategy and goals for the future.

Setting and Environment

The KCMC will be built in Ozu Abam, Abia, Nigeria. A small community, Ozu Abam, is located in Southeastern Nigeria at latitude 5.6 and longitude 7.75, approximately 30 minutes from Abia State's capital city of Umuahia. Reputedly blamed by authorities for the Biafran Civil War which took place in Nigeria from 1967 to 1970, the federal government has repeatedly withheld financial resources from Abia State, leaving the residents with limited resources and a weak and sometimes non-existent infrastructure. Along with a lack of funding for roadways, transportation, and utilities, federal support for job creation is absent in the region (World Igbo Congress, n.d.).

Due to the extreme poverty and ongoing conflict with the federal government, Ozu Abam has been the site of political and social unrest and, in 2009, 12 people were killed when residents of the area clashed with authorities. The etiology of the conflict was described by Azeez (2009) as secondary to the "inability (of politicians) to help the jobless youths of the area to get gainful employment and good education" (para. 2). Sa'idu (2014) states, "Failed leadership (is) the root of the near absence of critical infrastructures such as healthcare system, road-network, schools and boundary conflicts

in Abam, which is quite alarming" (para. 1). Mbanasor, Nwachukwu, Agwu, Njoku, and Onwumere (2013) state that there is a great deal of inequality in the income distribution of the area, with the regional per capita income falling below the national minimum wage. It is clear that the majority of people who reside in this region of Nigeria live in poverty and are frequently without the resources they need in order to access healthcare.

With a low-life expectancy and a high child and maternal mortality rate, Abian citizens will benefit from the assistance of healthcare providers and missionaries, however, the need does not stop with the occasional provision of care; there is a clear need for enhanced education and training for those who practice in the region. The number of patients cared for by the mission teams who have traveled to the area to provide care since the opening of the Upon This Rock Medical Centre (sister clinic to the KCMC) is further proof that the residents of the area are in need of access to healthcare that is up-to-date and evidence-based. It is the goal of the implementation team that the clinic bring in medical professionals not only to provide direct care to residents but also to provide local healthcare workers with education and training to ensure that clinic patients receive the best care possible throughout the year.

Strategic Plan

Strategic planning for the project was conducted using the SWOT Analysis method. The consideration of project strengths, weaknesses, opportunities, and threats was utilized to assist the team in determining the most effective way to move forward (Appendix A). During each phase of implementation the SWOT Analysis method enabled the team to consider how internal and external factors impacted progress in order

to continue to move the project forward in the desired direction and within the anticipated time frame.

The clear strengths of the development process include the dedication of those involved and a clearly defined mission. Opportunities for improvement were defined within the context of the team and methodologies which could be used to enhance planning success were determined.

Weaknesses were found to primarily involve the difficulties of team meeting due to geographical distance and the busyness of each individual. Threats to the program were identified as the need to raise a large amount of money, as well as team member lack of experience with fundraising and project development. Through the process of SWOT Analysis, the team was able to make decisions that assisted efforts; SWOT Analysis also helped individuals find ways to put their expertise to use to ensure the success of each phase of the project (Figure 4).

Population/Sample

The KCMC will provide care for the residents of Ozu Abam, Abia, Nigeria, who are primarily of Igbo descent and those who reside in surrounding regions. In addition to the Igbo language, English is the most commonly language spoken in Abia State and Christianity is the primary religion (World Igbo Conference, n.d.). According to the web site Ozu Abam the Land of Hope and Home of Hospitality,

> Ozu Abam people, especially the youth, are always seen working hard, they is never a dull moment in their history, they believe in having good time, they are industrious, education lovers. They hold seminars/workshops, special lectures, birthday party, beauty pageant, dance, sporting events and many more, some-time this activities are designed to raise money for individual or group project. Whatever they do, Ozu Abam as a whole knows how to have fun, and makes friends and make the world a little better in the process. (para. 1)

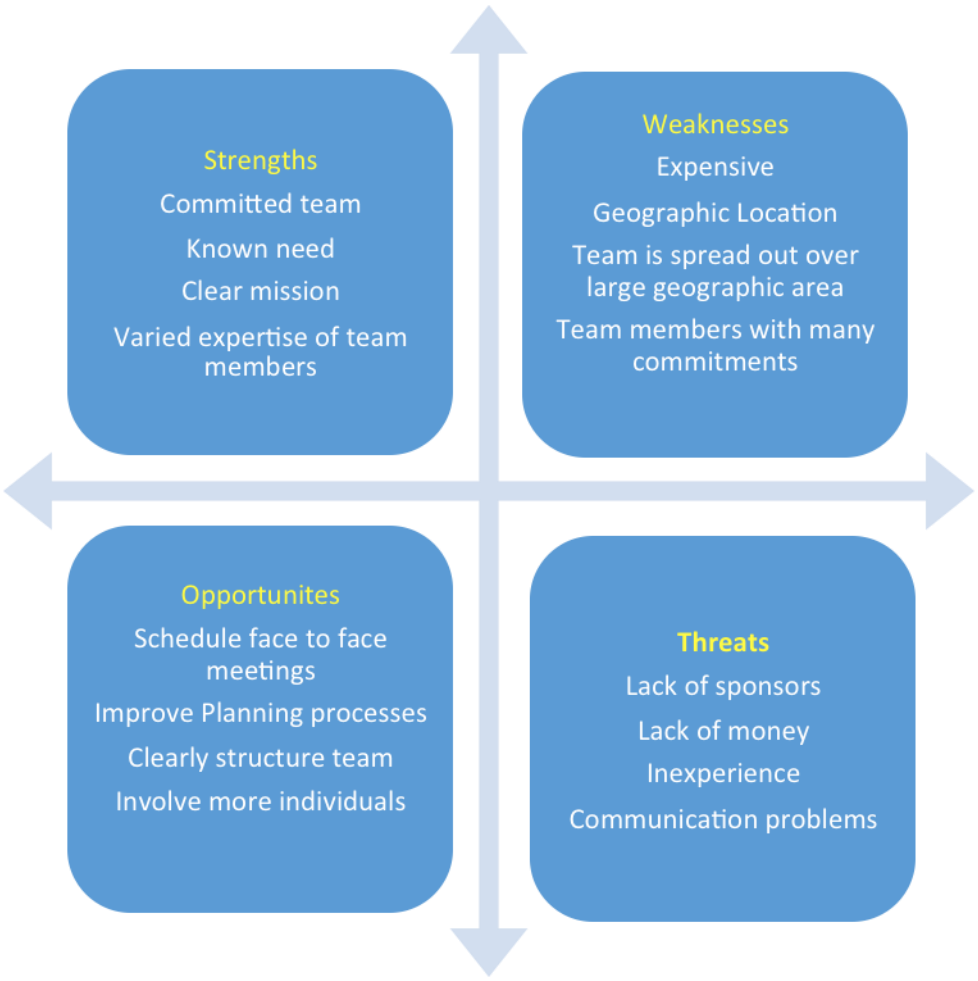


Figure 4. SWOT analysis.

Data Collection

The goal of the KCMC team is to bring expanded healthcare to the rural, underserved residents of Ozu Abam. The clinic will focus its efforts on women's health, pediatric care, and DM education and care. An additional focus of the clinic will be to provide education and training opportunities for local healthcare providers.

Patient Data

Data collected will focus on numbers of patients who receive care at the clinic and on patient satisfaction with care received. Clinic workers will keep records of gross

number of patients and will break down data indicating presenting problem and care received (primary care, women's health, pediatrics, and DM-related issues). Surveys of patients will be conducted to gather information as to the perception of care received. Data gathered will be used to guide future trips to the clinic to ensure each trip includes care providers with expertise in the most needed specialties.

Education Data

Data related to education and training will also be compiled and will be broken down by specialty and number of regional practitioners served. Pre- and post-test data will be collected with each training offered to determine the efficacy of the teaching. Longevity data will be collected 3 months, 6 months, 9 months and 12 months after each training to see if providers are continuing to utilize the new information or skill and to determine the providers' perceptions as to whether there was value added. The data compiled after trainings will be used when planning future mission trips.

Provider Data

Data will be collected from healthcare providers and compiled after each mission trip to the clinic. It is essential to clinic success that the board of directors receive structured feedback from volunteers to ensure that care provided meets quality standards. It is also important to ensure that volunteers are satisfied by their experience so that their future involvement will be assured. Information gathered will include each individual's level of satisfaction with the trip, perception of accomplishment of mission and personal goals, and efficacy of the team at providing enhanced care for the patients who were treated at the clinic. A five-step Likert scale will be used to compile satisfaction and qualitative data will be gathered to determine what each individual found to be the

strengths and weaknesses of the mission. Suggestions for future trips will also be solicited and will be evaluated by the board of directors during the strategic planning for each successive trip. Additionally data regarding education and training will be compiled to determine the perception of the educators as to the effectiveness of the instructional methodology and overall efficacy of the training. This data will be utilized alongside the data from the Nigerian care providers to ensure that teaching at the clinic is consistently relevant and appropriate.

Characteristics of Innovation and Practice Change

There are many areas of Nigerian healthcare in need of change and it is the goal of the KCMC developers that the clinic be an innovator in direct patient care, healthcare processes, and provider training. According to Osain (2011):: "The Nigerian healthcare system is poorly developed. No adequate and functional surveillance systems are developed. To achieve success in healthcare in this modern era, a system well-grounded in routine surveillance and medical intelligence as the backbone of the health sector is necessary, besides adequate management couple with strong leadership principles" (p. 470).

Therefore, to best meet the needs of its community, the KCMC will focus on providing evidence-based, innovative care for patients in the treatment of non-infectious disease and in the treatment and surveillance of infectious diseases. Additional foci will be on the implementation of innovative electronic medical recordkeeping and on providing basic and advanced medical training for local care providers.

As with all innovation, the clinic will only be successful if it is accepted and embraced by those for whom it was intended to help. According to Rogers (as cited by

McLeod, 2007), there are five stages which occur when an innovation is adopted: awareness, interest, evaluation, trial, and adoption. The overall success of the KCMC will depend largely upon the ability of the implementation team to engage supporters in the United States and in the Ozu Abam region as they work through the five stages of adoption. Fundraising efforts in the United States rely heavily upon the awareness of the community that the project is underway. Likewise, it will be important that the community served by the clinic be aware of its existence and mission.

It is tantamount to the project's success that the team generate interest in the United States so as to engage benefactors. It is also crucial that the community in Nigeria be interested in participating in the offered healthcare once the clinic is built to ensure the sustainability of the clinic. The continued success of fundraising will depend upon careful evaluation as those who provide funds will need to be given ongoing information regarding the project's progress. Additionally, the team will engage in ongoing process evaluation to ensure that their efforts net maximum results. Once the clinic is open, process evaluation will help the team determine whether the project is having the desired impact upon the health of the community. Adoption will take place when the residents of the area begin routinely using the clinic for healthcare. In order to best meet these five stages, the KCMC team must also consider other perceptual issues related to the adoption of innovation. These include relative advantage, compatibility, complexity, trialability, and observability.

Relative advantage is defined as the "'degree to which an innovation is perceived as being better than the idea it supersedes" (McLeod, 2007, para. 3). Success for the KCMC will be dependent upon the ability of clinic developers to design a facility that

will clearly meet the needs of the community it serves. It will be important that local residents see the existence of the clinic as a positive influence on their quality of life in order for them to continue seeking services and support the care providers' efforts at improving the wellness of the community. It will also be important that local care providers see value from the education and training received at the clinic.

Equally important to consider is the characteristic of compatibility. Defined as "the degree to which an innovation is perceived to be consistent with the existing values, past experiences and needs of potential adopters" (McLeod, 2007, para. 3), compatibility is an important consideration since the lived experiences of the majority of clinic developers differ greatly from those of the local community. To ensure that the clinic provides care that is compatible with the community's needs, the team includes members who were born and raised in the region.

Additionally, literature searches were conducted to determine the needs and healthcare beliefs of local residents. Understanding the nuances of any small community's belief system is an integral part of ensuring compatibility.

The second characteristic to consider is that of complexity. Complexity is defined as "the degree to which an innovation is perceived as difficult to use" (McLeod, 2007, para. 3).

Clinic longevity will rely, in part, on the perception of ease of use, including short wait times and clear, easy-to-follow treatment and discharge plans. The ease of participation and applicability to practice of education offered to care providers will also be important to maintain the KCMC as an effective teaching facility. "The opportunity to experiment with the innovation on a limited basis" (McLeod, 2007, para. 3), known as

trialability, will be important because change happens more smoothly if those impacted have the ability to try out a new idea without fully committing to the change (ChangingMinds.org, 2013). The KCMC will provide trialability, since adding a new educational healthcare facility to the region will provide patients and providers with the opportunity to avail themselves of the clinic's services without removing their ability to continue using already existing resources.

Because of the great need for healthcare in the region and the desire of the team to provide care to as many individuals as possible, there will be no predetermined number of patients for whom care will be provided during a medical mission trip. The team will arrive prepared to provide care for all individuals who present to the clinic and the team will attend to patients until resources become exhausted. Observability, "the degree to which the results of an innovation are visible to others" (McLeod, 2007, para. 3), will be met via direct contact with the clinic by those in the Nigerian community and will be present for those in the United States through social media, along with pictures and stories posted on the clinic's web page. The news media will also be integral to the observability of the clinic, especially for those who are unable to travel to the African continent. As do all successful innovations, the KCMC will strive to make changes that minimize complexity while maximizing relative advantage, compatibility, trialability, and observability (McLeod, 2007).

The KCMC is an innovative project that strives to make positive changes for a community in need. Through a partnership with the existing Upon This Rock Medical Center, KCMC developers will work diligently to ensure that the clinic evokes positive

changes in the area residents' access to medical care and in the overall wellness of those who reside in Ozu Abam, Nigeria, and surrounding communities.

Procedure

The KCMC will be completed in phases (Figure 5), with phase 1 completed with the commencement of ground breaking in January 2015, and phase 2 (provision of patient care and provider training) slated for January 2016. Phase 3 will occur continuously, following the inauguration of the clinic and the provision of medical care and training.

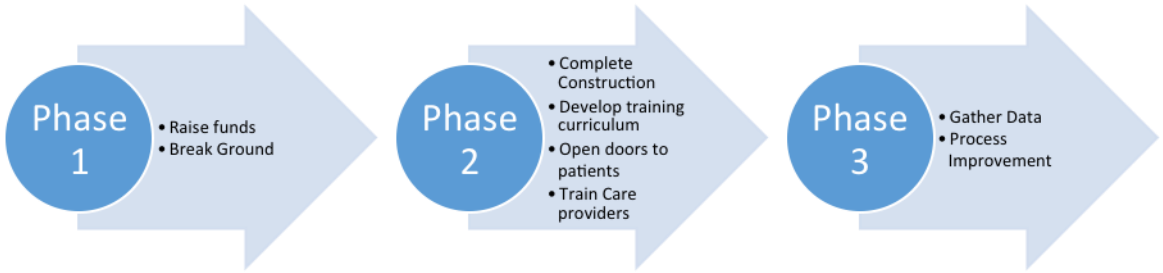


Figure 5. KCMC implementation.

Marketing

Marketing of the clinic to patients will be minimal due to the overall lack of healthcare in the region. The positive reputation of the Upon This Rock Medical Center, our sister clinic, will assist the KCMC obtain credibility with the intended clientele. The marketing of classes for healthcare professionals will take place on a course-by-course basis, with efforts targeted at the appropriate healthcare discipline for the proposed class. Classes will be marketed via online methods and through personal invitation. Marketing of the clinic to potential donors will include the use of social media and primary funding will occur via fundraising events, including bowling, community concerts, and by

holding an annual fun run each spring and an endurance horseback riding event every autumn.

Pre-implementation

Pre-implementation information as to the need for healthcare services in the area of the planned clinic site was gathered using a review of the literature. In order to understand the needs of the community, data was collected regarding the most common etiology of morbidity and mortality among residents of the Ozu Abam region of Abia State, Nigeria. The most populous nation in Africa, Nigeria suffers from the 17th lowest life expectancy in the world (Okpi, 2013). With an average life span of 52 years (Okpi, 2013) and the median age in the country at 17 years (WHO, 2013), Nigerians are clearly lacking sufficient access to healthcare. An additional look at the data indicated that Nigerian women and children are at the greatest risk for morbidity and mortality, with 2,300 children under the age of five and 145 women of child-bearing age dying each day in the African nation (UNICEF, n.d.). According to projections, Nigeria, like many African countries, is expected to see a significant increase in DM by the year 2030 and, along with it, an increase in associated health problems (International Chair on Cardiometabolic Risk, 2014). In response to this evidence, clinic developers determined that women, children, and those with DM were the populations with the greatest need for enhanced access to healthcare, and, therefore, they are the patient population groups on which the clinic will focus its efforts. Care provided at the KCMC will include pregnancy, labor, and delivery and postpartum care, as well as women's health and reproductive care. The clinic will have a pediatric clinic which will offer visits for sick children and check-ups and immunizations for well children. DM care in the form of

education and health assessment will also be provided, along with DM testing for those at risk. Once the clinic is under construction, a survey of residents of the area will be conducted to affirm or deny the need for the planned medical specialties.

Additional pre-implementation strategies included the determination of the metrics by which the clinic will judge its own success. Developers have set a goal of providing care and treatment for 1,500 patients during the first year. This will be the initial target and the projected number will be adjusted annually, based on actual attendance. Additionally, the clinic plans to provide education and training for healthcare professionals and the clinic developers aim to provide education for 25 care providers per class, with two or more classes offered each year.

KCMC team members also worked together during early planning to identify constraints and risk factors related to the development of the clinic. Time was identified as a primary constraint since inauguration was targeted for January 2016, which was a short time frame for overseas construction. Additional constraints and risks were determined to be due to the uncertainty of fundraising and the need to have sufficient funds in place prior to breaking ground and money is still being raised for clinic development. Sufficient funds were successfully raised for groundbreaking which transpired under the direction of James Umekwe in January 2015. Construction budget was based upon the estimated cost of supplies in Nigeria and using the current exchange rate of 199 Nigerian naira per US dollar. There was a range in estimated construction costs associated with the potential fluctuation in the costsoper of supplies and shipping fees. The estimated operational budget was determined based upon the current operating cost of the Upon This Rock Medical Center. Organizational issues are another constraint

since many team members are students with limited time, energy, and negligible expertise in clinic planning.

An evaluation of project risks was conducted and significant potential issues were identified. The greatest risk was found to be related to cost and resource management. Difficulties raising adequate funds or possibly inaccurate cost estimates are potential problems that would put the project at risk. Another significant risk is the fact that all of the people who are associated with the project lack expertise in clinic development. This lack of experienced staff is likely to lead to decreased productivity during both the planning and implementation phases. The team is in the process of developing an operational budget to ensure that the clinic remains fiscally viable over the long term (Table 2).

Project management is central to program success and ambiguous authority is an issue that also puts the program in danger. Because, as mentioned previously, the project has an all-volunteer workforce, leadership needs to provide clear direction and designate specific roles for individuals. It is also important that those in charge clearly delineate the accountability and authority associated with each role because a lack of clear expectations can negatively impact communication and hinder the program's forward momentum.

Table 2

*Estimated Operational Budget**

Expense	Cost in US dollars per month
Salary, physician (part-time)	3,750
Salary, nurse	750
Salary, cashier	375
Salary, security guard	100
Medical supplies	300
Cleaning and linens	225
Electricity	75-125
Tax (Nigeria)	unknown

*Based on exchange rate of 199 naira per US dollar.

Geography is an issue that, in many ways, puts the clinic at risk. The distance between the residences of the team leaders (two in California and one in Maryland) poses a threat to the project because, in addition to problems that arise from long distance communication, it is difficult to manage finances from afar. The location of the clinic on a different continent from where developers reside is another potential threat since it will be difficult to manage the day-to-day aspects of construction and, later, clinic management. During initial planning, developers looked closely at the risks associated with the clinic location and the facility's site was chosen based on the desire to minimize the risk to American students who plan to travel to the region to provide medical assistance. Originally slated to be located in the capital city of Umuahia, it was determined by the implementation team that the lower crime rate in the rural community,

combined with the greater need for access to healthcare among rural citizens, made it more strategic to locate the clinic in Ozu Abam.

The pre-implementation evaluation process is ongoing since the program is in early stages of development. As the project moves forward, it will be the job of team leaders to determine and control for additional risks and constraints to facilitate a smooth and on-time inauguration of the KCMC (Appendix A).

Post-implementation

Data Collection

Post-implementation data will be gathered from clinic patients and from healthcare providers who participate in educational opportunities at the KCMC. The information gained from a review of data will be used by the clinic board to determine program efficacy and to find opportunities for improvement. Medical record review will be used to gather nominal data regarding the chief complaints of those who receive medical care at the clinic; this information will be important as staff endeavor to ensure that they meet the actual medical needs of the community. The clinic developers have no plans to perform research on patients and therefore there is no anticipated need for internal review or informed consent. If the determination is made to use patient data for research or publishing purposes an internal review board will be consulted to ensure each of the ethical principles is upheld. All data gathered will be designed to enhance the ability of the providers at the clinic to meet or exceed the expectations of clinic patients. Although the clinic will open with the intention of specializing in women's health, pediatrics, and DM care, routine assessment of the health concerns of the area will need to be performed to maintain the clinic as a relevant healthcare resource for the

community. If the data indicates that patient needs are not adequately addressed by the clinic, the clinic board will reassess and make indicated changes to the medical care provided by the clinic.

Additionally, the clinic will gather data using surveys and pre- and post-testing to assess patient satisfaction and care provider engagement and learning. Although surveys are sometimes considered a less effective method of data gathering, they suit the KCMC because they are useful when researchers need a quick and efficient method of obtaining information, when there is a need to acquire statistically significant information from a large number of people, and when the needed information is not available any other way (Community Tool Box, 2013). Once original data is reviewed, researchers will engage in qualitative interviewing of subjects to better understand the results of the surveys. It will be important that the KCMC developers analyze data continuously to provide patients and healthcare providers with evidence-based and culturally appropriate care and opportunities. According to Innovation Insights (2006, p. 7), "To achieve this, teams must ensure that: persons surveyed represent the true population under study; respondents accurately understand the questions asked; people are willing to participate in the survey process; and the results are analyzed objectively."

Patient surveys used by the KCMC will be carefully constructed to enable surveyors "… to collect objective, unbiased information from a representative group of stakeholders" (Innovation Insights, 2006, para. 9). It is important to the validity of the tool that "participants in the survey are the stakeholders who are affected of involved in the processes under review in the survey" (Innovation Insights, para. 11). It is also important when using a sampled survey method of data gathering that sampling

techniques provide a fair and accurate representation of the group. To ensure that the patient sample is unbiased and fairly represents all stakeholders, surveyed clinic patients will be selected using a non-stratified random sample. The use of this technique will help ensure appropriate representation of the patients being treated at the clinic.

Once data has been collected and analyzed, the team will alternate between non-stratified and stratified sampling methods to both gather raw data and also compare satisfaction ratings between identified groups (AGA Insitute, n.d). The preferable sample size for patient survey was determined using Creative Research Systems' (2012) sample size calculator. Using an anticipated patient population of 1,500, a confidence level of 95% and a confidence interval of 5, it was determined that a sample size of 306 patients would be needed. Using this sample size and the non-stratified sampling method, every fifth patient seen at the clinic will receive a survey to complete prior to discharge. A census survey will be used for pre- and post-testing healthcare providers who attend clinic courses, requiring the initial response of 100% of attendees. This method will increase the validity of response and is a reasonable method of data gathering, given the small size of the group to be surveyed.

Follow-up surveys assessing for retained knowledge and change in practice will be mailed to providers one month, three months, six months, and one year after the course was completed. Once again, a sample size calculator was used to determine the required number of responses that would produce valid results using a confidence level of 95%, a confidence interval of 5, and a projected population of 25. According to the calculations, follow-up surveys will meet intended confidence levels if 24 responses are

received with each survey, which will be a challenge for those gathering data since survey responses are often difficult to obtain.

Survey questions will be carefully constructed in an attempt to provide for valid and reliable data gathering. The first characteristic of a good survey question is that it be non-threatening to the respondent. It is important that those completing the survey feel open to providing a correct and accurate response. Secondly, all questions should be standardized and constructed to ask for specific information and answers must be provided for all possible responses.

Initially, a five-level Likert scale will be used for the close-ended satisfaction questions, enabling the respondent to answer "always," "usually," "sometimes," "seldom" or "never," meeting the advised criteria of an equal number of positive and negative responses, with the addition of a neutral choice. A fifth response of "not applicable" will be offered for those who are unable to respond to a particular question. In addition, questions will be phrased carefully to avoid the use of words that have biased connotations. Questions will be worded as simply as possible to assist with comprehension for those at all educational levels and responses will be anonymous to enhance the candor of the patient (Management Analysis and Development, 2014). Close-ended questions will be used at first to enable clinic developers to gather and extrapolate data quickly and objectively.

Later, once the clinic has been in operation for more than six months, open-ended questions will be added to enhance the quality of the data gathered. Questions will be based on patient satisfaction with the care received. Additional questions will be

constructed to determine the perception of community healthcare needs and whether the clinic is focusing its efforts correctly.

Surveys provided to healthcare professionals who attend trainings at the KCMC will be based on pre- and post-testing to determine whether learning took place. Additional questions will be open ended and will be designed to allow the clinicians who participated in training to express how well they felt that training met their needs. Other open-ended questions will enable providers to give feedback on teaching methods and the usefulness of the information learned.

An important consideration when surveying the clinic's patients will be the issues of literacy and language. Fasokun and Pwol (n.d.) state, "According to the 2008 Global Monitoring Report, the most recent data for Nigeria shows an adult literacy rate of 69% (78% for men and 60% for women). More than 22 million people are illiterate, 65% of whom are women" (para. 1). This will be an important consideration since women's health is a planned focus of the clinic and surveys rely upon the ability of the participant to read and understand the questions. Additionally, although English is the official language of Nigeria, the residents of the Ozu Abam region are primarily of Igbo descent and speak one of 20 different Igbo dialects (Wikipedia, 2014). This diversity in language will make it prohibitive to translate the survey into each participant's native tongue. The issue of the language barrier will be addressed using a team approach to translation.

Because there are a number of members of the implementation team who speak Igbo, the team approach will be an effective way to guarantee that the translated survey questions match the intent of the English version of the survey. The team translation will begin when a subgroup translates the document into Igbo. A second group will then

review the document and decide whether it is ready to begin pre-testing. The use of the team approach improves the accuracy of the translation because it enables individuals to best utilize their personal talents within the context of the group, and, ultimately, the group approach improves the validity of the translated tool.

Unwritten translation (also known as translation-on-the-fly) will be used for patients who do not speak a dialect into which the survey was translated or for those who are illiterate and cannot read the survey independently. This method will be used only as a last resort since research indicates that this method of translation often produces results that lack validity (Harkness, 2013). Although not the best method of translation, it will be a necessary option since because to preserve the random selection of participants, it will be important during the selection process that those who need assistance with reading the survey are not excluded. Although it is not projected that the healthcare providers who attend classes will have language or literacy barriers, the team will be prepared to respond appropriately should any such issues arise.

Ethical Considerations

Those involved in the planning and implementation of care at the KCMC will be charged with providing care that is ethical and based on the "four principles plus scope" approach to ethics as defined by Gillon (1994). This approach was chosen for this project because it "enables healthcare workers from totally disparate moral cultures to share a fairly basic, common moral commitment, common moral language, and common analytical framework for reflecting on problems in healthcare ethics" (Gillon, 1994, para. 34). There will be no experimentation conducted at the KCMC; to best provide ethical treatment, standardized and evidence-based practices will be implemented. Patients will

receive confidentiality and no patient specific data will be gathered or reported. All information collected from patient surveys or the medical record will remain anonymous. The author has taken the University of Hawaii required Collaborative Institutional Training Initiative (CITI) course in Human Subjects Protection and to ensure ethical practice and this proposal has been reviewed by a committee consisting of faculty and clinical experts to ensure there is adequate human subjects protection. Because classes offered at the KCMC will be attended on a voluntary basis and there will be no formal assessment of skills or grading of students, ethical considerations surrounding clinic practice will center on patient care issues.

A primary ethical consideration when planning care at the KCMC is that of autonomy. The autonomy of an individual is protected only if he or she makes a medical decision after completely understanding any information and education provided by the practitioner. If the information is not comprehended by the individual, the decision made may not be an informed one, and autonomy will be compromised. Providing adequate medical education can be difficult if there is a significant language or cultural barrier between provider and patient. The use of medically trained interpreters when a language barrier is identified will be one way that clinic providers will provide patients with autonomy. Additionally, providers will be required to be truthful in all dealings with patients and to provide a full accounting of risks and benefits so that patients can make educated choices regarding their healthcare.

Non-maleficence and beneficence are ethical principles that are of great importance to the clinic developers. The goal of the KCMC is to help those in the community to regain or maintain a high level of health; therefore, it is important that

clinic staff provide care that is evidence-based and provided by skilled clinicians. Those who wish to travel to the KCMC to provide care will undergo a rigorous screening process which will include a behavioral panel interview, drug screening, reference check, and a comprehensive background check. When appropriate, licensing agencies will be consulted to ensure that all accepted care providers are in good standing within their profession. Additionally, all providers will be evaluated to ensure they have mastered all psychomotor skills needed to perform their duties at the clinic. Although it is impossible to control for all variables associated with poor patient outcomes, careful screening of providers, in conjunction with a skill evaluation, will reduce the risk of harm and increase the ability of the team to work together to have positive patient outcomes.

Because of the location of the clinic and the reliance upon donations for funding, it is predicted that the KCMC's resources will be scarce, making justice an ongoing ethical concern for clinic developers and staff. It will be important that resources be distributed fairly to those who are in the greatest need. Due to the uncertainty of the environment in which the clinic will be located, the definition of "greatest need" is likely to be determined on a case-by-case basis if a needed resource is scarce. The goal of the clinic developers is to treat each individual with equality, however, should there be incidence where resources are limited and cannot be provided to all those in need, an ethics committee will be called on to determine the most just way to utilize the resources. The ethics committee members will be chosen at the beginning of each trip to the KCMC and will include members from all medical specialties.

The final principle to consider is that of scope, defined by Gillon (1994) as "(first) … who falls within the scope of the prima facie principle of respect for autonomy. The

second is the question of what is the scope of the widely acknowledged 'right to life'; who and what has a right to life?" (para. 25). In this project, beneficence and non-malfeasance do not come into question when considering scope because all clients who seek care at the KCMC will receive equal consideration with regard to those ethical principles. However, it is expected that questions related to scope in relation to autonomy and right to life will be encountered during the operation of the clinic. The determination of competence when considering the ability to make medical decision and questions related to the employment or withholding of lifesaving intervention will be decided by the ethics committee whenever the issues come into question. Ethical behavior on the part of all care providers will be a focus of the clinic board and any actual or perceived breach in ethics will be brought to committee for discussion and process improvement.

Limitations

Various limitations exist in the provision of care at the KCMC and in the ability of the team to collect data. Care that is provided will be limited by the availability of qualified providers and resources and it is anticipated that some patients will have medical needs that are outside the scope of care providers. The clinic will be designed to focus on maternal-child, pediatric, and DM care, however, it is likely that those with other medical conditions will seek care from the clinic and will need to be referred elsewhere for medical treatment.

Despite plans to control for many issues related to data gathering, there are known limitations in the clinic's choice to use surveys as a primary data-gathering tool. The use of surveys to obtain information from patients and professionals who have received training at the clinic may provide data that does not necessarily reflect the views of the

population as a whole and might not be able to be extrapolated to other situations. Additionally surveys do not always provide a clear correlation between cause and effect.

The possibility of a language barrier or problems with literacy are known obstacles when attempting to gather data using surveys and are issues likely to be faced by KCMC providers. The use of interpreters to translate surveys or the verbal collection of data from those who are illiterate can lead to subtle or overt changes in the questions and responses which may significantly impact the data gathered, especially if multiple translators are used. Another significant issue is that of participation; since surveys are voluntary (and to preserve ethical principles they cannot be required), the data collected may not come from a true cross-section of the population of interest. Although the survey instruments will be carefully constructed to assess issues on which the clinic developers wish to focus, as new tools they will lack confirmed validity and reliability.

Summary

Slated to open in January 2016, the KCMC will be built in the rural community of Ozu Abam, Nigeria, and will provide care for women, children, and patients with DM who currently lack adequate access to trained and licensed care providers. The clinic will focus on the provision of evidence-based care for underserved people, however, it will also center its efforts on providing education and training for Nigerian providers who work in the aforementioned specialty areas. The clinic will focus on improving the health of the community on a daily basis and through once or twice yearly visits from providers from the United States who will care for the residents of the area while also providing education, expert knowledge, and guidance for care providers of the region. Data will be gathered from patients and recipients of educational offerings to ensure that clinic

developers and providers provide care that is perceived as culturally and regionally appropriate. It is the goal of the clinic developers that Kristina's vision become a reality and that the residents of the Ozu Abam region of Nigeria benefit for many years from her desire to help those in need.

CHAPTER 4. RESULTS

Team Formation

The development of an implementation team was the first step taken in the in the KCMC project. The participation of Kristina's parents was ensured prior to the beginning of the project. Once their interest in the clinic development was secured, a multidisciplinary team was assembled. In addition to the initial partnership with James Umekwe, individuals were recruited to join the team either due to their interest in honoring Kristina's vision to provide care and/or due to their personal interest in providing care for those in the region to be served by the clinic. The initial KCMC implementation team was fully assembled by October 5, 2013 and was comprised of 11 members. Each individual's level of anticipated contribution was determined after consideration of Titler's (2008) description of the specific steps necessary for the successful implementation of an EBP. As the project progressed and community interest grew, ancillary members were added and roles within the group evolved; however, the core members and their roles remained stable.

The steps needed for successful implementation of an EBP, as described by Titler, are "knowledge creation and distillation, diffusion and dissemination, and organizational adoption and implementation" (2008 p.1.114). According to the literature, successful completion of each step requires a different type of leadership. Step 1 ("knowledge creation and distillation") was accomplished through a review of the literature regarding healthcare needs in Ozu Abam, Nigeria. Information obtained from research was disseminated to the group via formal and informal communication and was shared during in-person meetings and through the use of social media. Data gathered from the literature

was used to determine the focus of the clinic. The formation of closed social media groups proved to be a highly successful means of communication due to the wide geographic region over which group members were spread. The "diffusion and dissemination, and organizational adoption and implementation" steps were the primary foci of the group's work and members were provided roles based upon their interests (Appendix B).

Administrative Structure

The KCMC was organized in the United States and Nigeria under Clarrion Call, Inc., a corporation established in Upper Marlboro, Maryland in 2012 and awarded official 501 (c) 3 status in 2014. A review of records in the United States indicated that Clarrion Call, Inc. was under the direction of James Umekwe, had an annual revenue of $270,000, and was the employer of five individuals (Manta, n.d.). Designated as a health maintenance organization, Clarrion Call, Inc. was the owner of record for Upon This Rock Medical Center, sister clinic to the KCMC. The organization of the KCMC under the already established corporation helped the team with fundraising and expedited construction because money that was donated was immediately tax deductible and the amount of time needed to begin construction was decreased due to the elimination of complicated and time consuming Nigerian licensing and permitting procedures.

The process followed when seeking incorporation of a business in Nigeria was found to be lengthy, beginning with the filing of the application with the Corporate Affairs Commission (CAC) because only legal practitioners and some accountants were able to file the needed documents. In addition to the application form, the names of designated trustees and the minutes of any official meetings between trustees must be

submitted. Once the application was accepted a notice would need to be printed in two newspapers, both in circulation in the region of the corporation's proposed location, and one of these had to have national circulation. Such newspaper notices had to include an invitation for stating any objections, and those in opposition to the formation of the not-for-profit corporation had twenty-eight days to officially object. If there were no official objections, or if the objections were rejected by the CAC, the corporation can then be registered officially by the government (Odumosu, 2012). Once the not-for-profit status was granted by the CAC, the business would need to be registered under the Federal Ministery of Health and Federal Ministery of Finance; and later by the State Ministery of Health. This process usually requires more time, money and complex documentation (J.Umekwe, personal communication, April 30, 2015). Because the KCMC was organized under the auspices of the already approved Clarrion Call, Inc. the lengthy process was avoided, enabling the team to immediately accept donations and use the money to break ground on the clinic in a timely manner.

The time from project development to groundbreaking was also shortened by structuring the KCMC directly under Clarrion Call Inc. because the use of the existing not-for-profit status changed the building permitting process in Nigeria. Ranked by the World Bank Group (2015b) as the 171 slowest nation at processing construction permits (out of 189 nations), it would have taken an estimated 105.9 days to obtain a building permit as a unique corporation. By building the KCMC next door to the existing clinic, and by organizing the clinic under Clarrion Call, Inc., the permitting process was avoided along with the need to provide any unexpected payments to individual building inspectors (J. Umekwe, personal communication, April 30, 2015).

Although it was anticipated during the construction phase the KCMC would remain under the auspices of Clarrion Call, Inc., the process of forming of a new board of directors to be in place by clinic inauguration was begun in Spring, 2015 to ensure those who provide care at the KCMC do so in keeping with the established mission, vision and values of the original clinic developers.

Stakeholder Analysis

In order to identify others who might be recruited to assist in clinic development efforts, the KCMC implementation team performed a stakeholder analysis. In keeping with recommendations of The World Bank Group (2001), the team "organize[d] the stakeholder data according to relative power/influence and salience of each stakeholder to understand their potential support or opposition for the proposed reform" (para. 13). The ability to categorize stakeholders using the terms "promoter, defender, latent, and apathetic" (The World Bank Group, 2001, para. 13) helped with initial efforts to identify those impacted by the development of the KCMC.

Table 3 shows the organization and categorization of known stakeholders according to the categories promoter, defender, latent, and apathetic. During this process stakeholders for all phases of the project were identified. The identification and classification of stakeholders assisted the team in engaging others in the effort, enhancing fundraising and publicity efforts.

Table 3

Stakeholder Analysis

Promoters	Defenders	Latents	Apathetics
Believe project is important and whose participation will have a direct impact upon the success of the project	Believe project is important but participation will not have a direct impact upon the success of the project development	Assign low priority to the project but their actions can impact the success of the project	Assign low priority to the project and cannot impact the success of the project
KCMC project team members	California State University, Chico School of Nursing/ Sigma Theta Tau	Nigerian government	Those in Nigeria who receive adequate health care
Dave and Sandra Chesterman and Kristina's family	Residents of Ozu Abam, Abia State Nigeria	Participants in fundraising activities. (e.g., runners in 5K/10K race)	U.S. government
CSUC nursing students and volunteers	CSUC university administration	Vendors in U.S. and Nigeria who provide goods and services for clinic	
James Umekwe, founder of clinic and sister clinic	University of Hawaii School of Nursing and Dental Hygiene	HCP from U.S.	
Project SAVE (Janice Walker)		Local businesses and media	

Planning for clinic construction began on December 18, 2013, with the generation of a proposed footprint for the clinic. In keeping with clinic goals to provide care for women, children, and patients with diabetes, the footprint planned for a 4,800 square foot facility which featured an operating room and post-anesthesia care unit, labor and delivery suite, three examination rooms, diabetes education center, dental examination room, laboratory, medical imaging, and ophthalmology examination room (Figure 6). An

architect's renderings of clinic plans were completed on February 18, 2015, enabling the KCMC implementation team to begin to form a construction budget (Figures 7-9).

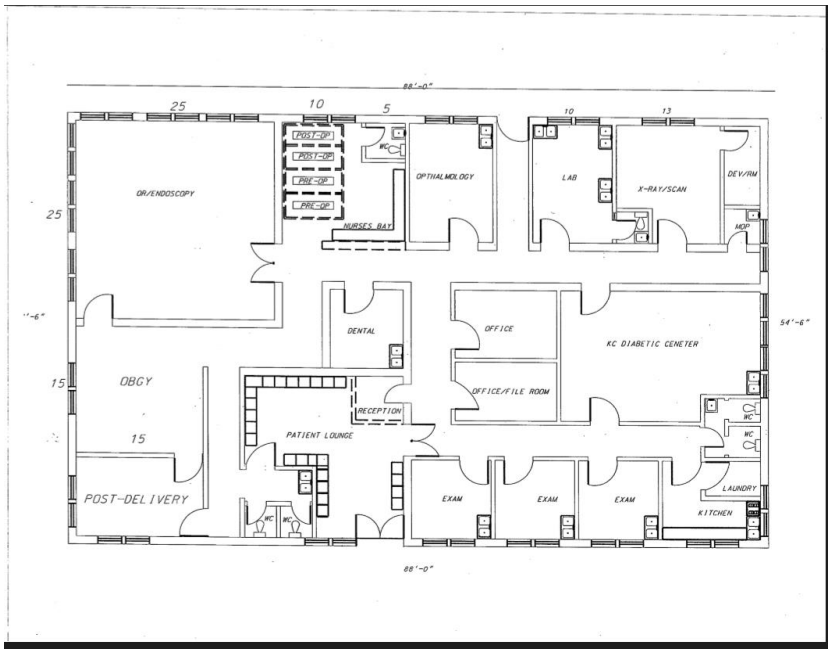
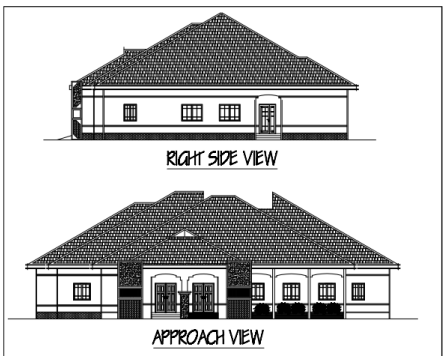


Figure 6. KCMC building layout.



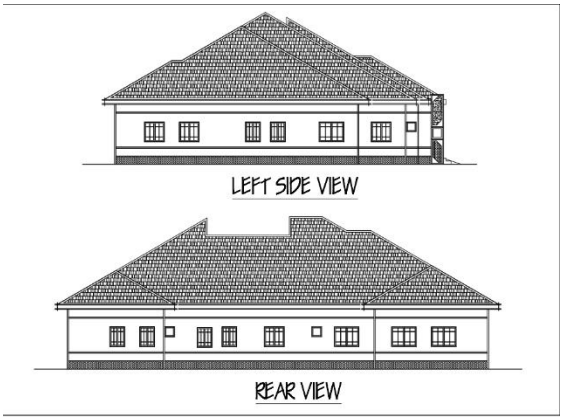


Figure 7. Right- and approach-side views.

Figure 8. Left- and rear-side views.

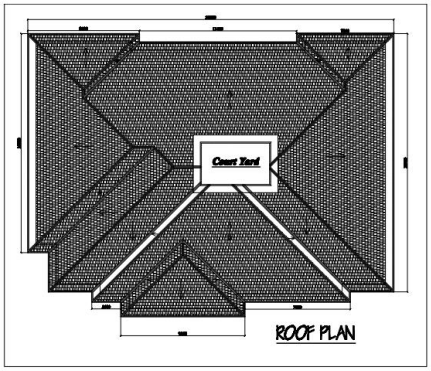


Figure 9. Roof plan.

In order to ensure that the clinic was built on a reasonable budget, the team deliberated between two builder options. The first option considered was working with a Christian mission group based in Arkansas. The organization would recruit construction workers from the United States to travel to Nigeria and construct a prefabricated building with portions of the structure built and shipped in from the United States. The advantages to this option included having the work completed quickly with a high likelihood of remaining on target with the anticipated budget and timeline. The equipment and supplies used would be standardized and from the United States and, as such, were anticipated to be of better quality than those sourced locally. A general contractor would be on-site,

managing construction on behalf of the team; and the expected high quality of the work would potentially enhance the patients' care. The identified issues to this option included the need to have all funds available prior to the beginning of construction and the duration that a building constructed of timber would survive in the Nigerian environment. The second proposal was to build the clinic in five phases, continuing work as funds became available. Option 2 would be less expensive overall and would utilize local residents to construct the building (Figure 10). Although it would take longer to complete the construction with option 2, it was expected to offer flexibility in financing and construction and the materials used would be more likely to withstand the elements over time. Additionally, it was decided it would be advantageous for the money spent on construction to be spent locally, providing jobs workers from the region and purchasing supplies from local businesses. After weighing the pros and cons of each option, the team determined that it would be most advantageous to move forward with option 2, enabling the adoption of a timeline and budget for the project.

Budget

The capital funds needed for clinic construction were estimated based upon needed materials, labor, and shipping costs for option 2 and were determined to be between $80,000 to $100,000. Groundbreaking costs were estimated to be $30,000. The range in cost projection was due to the fluctuating exchange rate between the US dollar and Nigerian naira, as well as the uncertain costs associated with the purchase of building materials and the fluctuating cost of shipping. Project S.A.V.E of Chico, a local charitable organization, pledged to supply all needed medical equipment and furnishings

to be shipped to Nigeria upon the completion of construction; however, shipping costs, estimated to be $5,000, were to be paid by the KCMC budget (Appendix C).

Option 2

- Initiate a contract with local contractor.
- Modify existing concept design for easy flow and finishing.
- Split project into two (5) phases based on funding available. (In this alternative, we determine preliminary engineers cost estimate and separate labor and material cost. Negotiate with contractor cost of labor, while we supply materials to guarantee quality and quantity)

Phase 1

- Clearing & grubbing, site grading, excavation for foundations, stone/concrete blinding, block work, form work, carpentry/iron work, filling and compaction, casting concrete floor slab. (James will be on site to help supervise and ensure appropriate guidelines are followed): 1/5/15 – 1/30/15

Phase 2

- External walls using local cement blocks, internal and external columns to be completed using local materials and labor to lintel level: 2/1/15 – 2/18/15
- Casting of beams and leveling to roofing level: 3/1/15 – 3/14/15

Phase 3

- Roofing and members and laying of heat barrier membranes: 3/14/15 – 3/30/15
- Installation of doors and windows: 4/1/15 – 4/15/15

Phase 4

- Conduits – electrical and plumbing/piping, IT conduits: 4/1/15 – 4/30/15
- Plastering and flooring: 5/1/15 – 5/30/15
- Pulling of electrical and communication cables and installation of fixtures: 6/1/15 – 6/30/15
- Plumbing fixtures: 6/1/15 – 6/30/15

Phase 5

- Tiling: 7/1/15 – 8/15/15
- Painting/landscaping: 8/15/15 – 9/30/15
- Installation of medical equipment, supplies, and devices: 9/30/15 – 12/24/15
- Dedication: December/January 2015/2016

Figure 10. KCMC building timeline.

The proposed operational budget was determined based on the actual costs associated with running Upon This Rock clinic, the sister clinic to the KCMC. The majority of care was proposed to come from American volunteer providers who would pay their own expenses. Current costs to those from the United States who provide care at Upon This Rock clinic include the price of airfare and an additional four hundred dollars used to pay

for transportation for the three hour journey from the airport to the clinic, as well as for room and board for the duration of the trip. To date only short mission trips, two to two and a half weeks in duration, have been brought to Upon This Rock; however, it was determined that longer trips, two to three months in duration, would have the most positive impact on the health of the community and should be available for providers who were willing to remain at the clinic for an extended amount of time. The anticipated cost for these optional longer mission trips was determined to be $1500 to $2,000 dollars per provider.

As previously stated, data from Upon This Rock were used to help determine budget for the KCMC. The initial estimates were based upon the anticipation that the current costs of running the Upon This Rock clinic would increase by 50% once the KCMC became operational. The salary for the KCMC staff was determined to be the primary cost of clinic operation. It was anticipated that the clinic would employ one part time physician who would be responsible to conduct rounds on the patients at the clinic when needed. It was also determined that the clinic would be able to provide care with a staff of two nurses and one or two student nurses, the latter of which would receive only a small stipend while they are training. A part time physician who was currently treating patients at Upon This Rock agreed to expand his services to include patients in both clinics. Security at night was determined to be needed so the possible construction of a fence to provide additional safety for patients and providers in the future was to be considered. Finally, a part time cashier/admitting clerk would be needed, especially when the healthcare professionals from the United States were at the clinic on a medical mission. Additional operating expenses incorporated in the operational budget included

the cost of medical supplies, linens and cleaning and electricity. Not-for-profit organizations in Nigeria are required to file taxes every three years and the potential for future taxation if the clinic was unable to document income and expenses as breaking even was considered. This amount is currently unknown since Upon This Rock has not yet reached sufficient longevity to file taxes with the Nigerian government. The 501(c) 3 status in the United States alleviates concern related to taxation in that country. Water was supplied by a well on the property and did not account for any additional cost. Food for patients at Upon This Rock comes from families so to date there has been no expense incurred by the clinic for feeding patients (see Table 2 for anticipated operating costs in US dollars).

Fundraising

Fundraising efforts for the KCMC began in November 2014, and money was raised through crowdfunding,(defined as using the internet to raise money by collecting small amounts from a large number of individuals), private donations, and small and large fundraising events held both in the Chico, California, area and in Kristina's hometown of Livermore, California. By January 2015, the funds in the bank were sufficient enough to begin phase 1 of construction (Table 4).

The identification of stakeholders helped the team identify potential supporters. In response to sponsorship requests, in-kind donations were received in the form of goods and services (such as saleable customized reusable bags purchased at the manufacturer's cost), items for auction (such as family health club memberships and theater tickets), reduced advertising costs, and time and goods from local businesses and corporate chains for fundraising events. Due to the team's efforts recruiting stakeholders, the clinic was

Table 4

Funding Sources

Funding source	US dollars
Crowd funding	7,198.10
2014 Live, Laugh, Love and Run 5K/10K	5,358.58
Bowling fundraisers (2014 and 2015)	4,500.00 (approximate)
Live, Laugh, Love and Ride endurance horse race	4,550.00
Private donations	17,050.00
Miscellaneous fundraisers, donations and sales	1,870.16
Total received	*40,526.84*

chosen for sponsorship by the California State University, Chico Student Nurses' Association in 2014. Crowd-funding continues to bring in donations and future fundraising events are planned to ensure construction of the clinic is completed. Fundraising activities included a "take over" day at a local restaurant that has provided the clinic with a percentage of the day's profits on March 29, 2015. The second annual Live, Laugh, Love and Run 5K/10K fundraiser was held on April 19, 2015. Future events already in planning include the second annual Live, Laugh, Love and Ride endurance horseback riding fundraiser is scheduled for September 2015.

Groundbreaking for the clinic took place in January 2015; by February 2015 the ground was excavated, the foundation laid, and concrete floors completed (Appendix E). The overall cost of groundbreaking and initial construction was 4,757,500 naira, equivalent to $25,800, based on the exchange rate at the time of trade of 199 naira per US dollar (Table 5).

Table 5

Building Costs

#	Item	Unit	Unit cost	Total naira
1	Site clearing	lump sum		65,000
2	Uprooting all trees/palm trees	lump sum		95,000
3	Setting out, levelling, pegging: wooden pegs, ropes, contractor, 3 masons, 1 unskilled labor			52,000
4	Labor: excavation and trenching			192,000
5	Labor: casting 4" concrete in all trenches			202,000
6	9" concrete blocks for foundation to DPC	3,100	150	465,000
7	Sharp sand for casting and block work	11 trips	15,000	165,000
8	Stones for casting foundation	8 trips	35,000	280,000
9	Cement (includes trucking, loading, off-loading)	130 bags	2,100	273,000
10	Filling outside/inside foundation with red and laterite	69	7,800	538,200
11	Labor: filling outside/inside foundation			170,000
12	Labor: manual compaction of entire foundation			75,000
13	Labor: masons laying blocks	60	3,125	187,500
14	Contractor, supervisors to DPC			100,000
15	Cement for concrete casting 4" floor slab	168 bags	2,100	352,800
16	Sand	15 trips	15,000	225,000
17	Gravel/stone	12 trips	35,000	420,000
18	1x12x12 wood boards	120	1,300	156,000
19	2x3x12 soft wood	150	400	60,000
20	Binding wire	2 bundles		12,000
21	2" nails	1 bag		6,000
				cont'd
22	Labor: casting concrete foundation floor slab			230,000
			Subtotal	**4,321,500**
23	6" block (paid, unused)	2,500	140	350,000*
24	1/2" rods (paid, unused)	40	1,400	56,000*

#	Item	Unit	Unit cost	Total naira
25	8 mm rods (paid, unused)	30	1,000	30,000*
			Total	**4,757,5000**

199 Nigerian naira = 1 US dollar

Construction of the foundation and cement floor were completed on time by the end of March 2015. The team plans to raise the roof in June 2015, before the onset of the Nigerian rainy season. If fundraising for and construction of the KCMC remain on target, the clinic is anticipated to open its doors and begin providing care for the residents of the Ozu Abam region of Nigeria in January 2016.

CHAPTER 5. DISCUSSION

Interpretation of Findings

The findings used for clinic planning by the KCMC implementation team resulted from an extensive literature review, the examination of international health status statistics and the compilation of anecdotal evidence from those with a personal understanding of the healthcare needs in the Ozu Abam region. Following their analysis of the data the team concluded that there is a great need for improved access to healthcare for the residents of this rural area of Nigeria. Furthermore, all levels of research indicated that the areas of greatest need were women's health, pediatric care and diabetes care and education. The clinic implementation team utilized the findings and developed plans to construct a facility focused on providing care for patients with needs in these specialty areas. The team's evidence based understanding of the specific healthcare needs in the region will be used to guide recruitment of providers from each specialty when forming teams to travel to the clinic.

Implications

The opening of the KCMC has positive implications for those who reside in the United States and for patients and care providers in southeastern Nigeria. Ultimately, the goal of the KCMC project is fourfold. First, to provide much needed health care for citizens of rural Nigeria; it is anticipated also that the care provided will have a positive impact on the health of the local community. Second, to provide Kristina's family and friends with a way to honor her memory and life's ambitions. Third, to provide a long-term opportunity for student nurses from the United States to enhance their clinical skills while obtaining a global vision of nursing. Fourth, to provide Nigerian care providers

with greater knowledge regarding up-to-date and evidence-based medical practices that are designed to meet the needs of the providers and the community served by the clinic.

Recommendations

There are many changes anticipated following the completion of the KCMC. Similar to Upon This Rock Medical Center, the clinic was designed to be open throughout the year, however volunteer providers from the United States were still considered an integral part of the clinic's services. Rather than rely upon only short-term volunteer trips, long term trips of two to three month duration were planned for incorporation. The team anticipated that groups from the United States would be comprised of ten providers, including two physicians/surgeons, two medical students and six nurses or nursing students. Volunteers historically have resided in the home of James Umekwe, however with the potential for longer trips the construction of a ten bed dormitory to house the volunteers was determined to be an eventual priority. The construction of a cafeteria would be a positive change as it would enable volunteers to make food choices and pay as they go rather than make an upfront payment for room and board. A cafeteria would also make food available for patients and visitors, many travelling a long distance to reach the clinic. Additional capital funds were budgeted for the eventual purchase of an additional generator to provide electricity when the power grid was not functioning.

A formal business plan was determined to be necessary to the success of the clinic operation and would be developed following successful fundraising for the initial capital used for construction. The development of the aforementioned board of directors to run operations was also determined to be a priority and team members were planning for the

board to be in place in time for the clinic's inauguration. Potential members included Kristina's relatives and involved classmates well as individuals with knowledge as to Nigerian culture and the needs of the residents of rural Abia State, Nigeria.

Doctorate of Nursing Practice Essentials

Essential I: Scientific Underpinnings for Practice

Defined by the Agency for Healthcare Research and Quality (AHRQ) (n.d.) as "Applying the best available research results (evidence) when making decisions about health care" (para. 1), EBP was chosen as the scientific underpinning of the KCMC. The delivery of care based on best evidence, as well as the provision of education based on current evidence for practice are fundamental aspects of the KCMC.

Essential II: Organizational and Systems Leadership for QI and Economics

Quality improvement is the planned focus of KCMC program evaluation efforts. Although clinic planners utilized the literature to determine the greatest need in the clinic's region, there will be ongoing needs assessments and the regular gathering of data from patients via the use of non-stratified random sampled surveys to ascertain the perceived relevance and appropriateness of care. Data will also be collected from Nigerian- and U.S.-based providers to help ensure the clinic is meeting its overriding goal of providing care that is relevant, sustainable, and evidence-based.

Essential III: Evidence-Based Practice/Translation Science

As the defined scientific underpinning for the KCMC, all providers practicing at the clinic will follow EBP guidelines by providing care that is based on a blend of evidence from the literature, personal knowledge, and expertise, as well as the preferences of their patients (AHRQ, n.d.).

Essential IV: Information Systems/Technology

The use of technology was integral to initial success in fundraising and team building. Social media and crowdfunding sites enabled the team to communicate with each other and to promote and publicize the clinic to the public, rapidly raising the funds needed to begin clinic construction according to the established timeline. The use of an electronic health record is under consideration. Barriers to this form of record maintenance include lack of access to the internet for secure storage of data and concerns about the lack of technical support in the event of technical problems or equipment breakage.

Essential V: Health Care Policy and Ethics

The clinic will uphold all medical ethical principles per Gillon's (1994) "four principles plus scope approach," previously discussed.

Essential VI: Inter-professional Collaboration

The KCMC implementation team was intentionally multidisciplinary and multicultural, and, as such, ongoing inter-professional collaboration will be a focus throughout the lifetime of the clinic.

Essential VII: Prevention and Population Health

The improvement of access to evidence-based healthcare is designed to have a positive impact on morbidity and mortality among the patient's primary care populations of women, children. and patients with DM who reside in the Ozu Abam region of Nigeria.

Essential VIII: Advanced Nursing Practice and Education

The educational goals of the clinic have been discussed throughout. Education will be provided for local providers by those who travel to the clinic from the U.S. Additionally, it is the goal of the clinic to enhance the education and provide a global view of healthcare for those to travel to the clinic from the U.S.

Plans for Dissemination

Initial dissemination of the project and the successful completion of phase 1 took place via public defense on May 4, 2015. Future plans include publication in a peer-reviewed journal following inauguration of the clinic in January 2016.

Summary

The focus of This DNP project was phase 1 of a 3-phase endeavor with the goal of the establishing the KCMC in southeastern Nigeria. Phase 1 of this larger project included team building, fundraising and groundbreaking for construction. The activities of phase 1 began with determining the healthcare needs of the residents of the regions served by the clinic, accomplished through a review of the literature and through personal interviews with people who originate from southeastern Nigeria. Fundraising and team building were fundamental during this phase which culminated with the completion of the clinic's foundation and cement flooring in January 2014.

Besides fundraising and groundbreaking activities, the focus throughout phase 1 was on ensuring the clinic would provide culturally appropriate and sustainable care. As previously stated, research findings concurred with anecdotal evidence and it was clearly demonstrated that there was a need for DM education and care because it is a chronic illness that has been identified as a significant contributor to non-infectious mortality

throughout southeastern Nigeria. Additional research into healthcare issues in the region revealed that in addition to the need to decrease DM-related morbidity and mortality there is a need for improvement in obstetrical and pediatric care. Maternal-child death rates remain high in rural Nigeria due to inadequate training of care providers, which leads to ineffective problem recognition and treatment during pregnancy, labor, and throughout the immediate postpartum period. The high death rate in children under 5 in the region indicates that there is a need for vaccination programs and improved pediatric care. Additional health care issues related to Ebola hemorrhagic fever in the region made headlines after planning for the clinic had begun, which further demonstrated the importance of providing local residents with greater access to evidence-based healthcare (Sun News Online, 2014). Based on this evidence, it was determined by the KCMC implementation team that the care provided at the KCMC would focus on women, children, and patients with DM, with the possible addition of further health services, including care for those with acute infectious diseases and dental care, ophthalmology, and surgical services.

The KCMC is a project that was devised as a way to help those who reside in rural Nigeria and are in need of medical care, while also providing an opportunity for those who knew Kristina Chesterman with a long-term way to honor her memory. The KCMC SIP focus was on team building, fundraising, and groundbreaking activities and, to this end, the team was successful, with phase 1 of construction beginning in January 2015, and with clinic inauguration planned for January 2016.

Once the clinic is open sustainability will be a focus and it is anticipated that student nurses and licensed care providers from the United States will travel to the

KCMC one or two times a year to provide care for local patients and education for local providers.

Conclusion

There now stands in Ozu Abam, Nigeria, the beginnings of a structure that will soon provide healthcare providers with a place to help the impoverished and medically underserved residents of the region. The construction of the clinic was inspired by a young woman who tragically died before she could complete all she set out to do in life. Kristina's story impacted individuals from around the world and funding for construction has come from as far away as Australia and South America. It must be remembered that although a large number of individuals have contributed time, money, and knowledge toward the project's success, it was due to the inspiration that came from Kristina's strength of character and her lifelong quest to help others that the KCMC came into being, and it is because of Kristina that the team will continue its work and ensure that the KCMC is completed and ready to provide care on schedule. Ultimately, it is the desire of the KCMC team that the clinic provide healthcare for years to come, maintaining Kristina's high standards of excellence as they ensure that a very special person will achieve her goal posthumously, leaving the world a little better than she found it.

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APPENDIX A

PROPOSED TIMELINE FOR KCMC

	2014				2015							2016		
Task	A/M	J/J	A/S	O/N	D/J	F/M	A/M	J/J	A/S	O/N	D/J	F/M	A/M	J/J
Fundraising	X*	X*	X*	X*	X*	X	X	X	X	X	X	X	X	X
Solicit donations for building supplies					X*	X	X	X	X	X	X	X	X	
Ship materials to Nigeria						X	X	X	X	X	X	X	X	
Break ground on construction					X*									
Travel to Nigerian clinic construction site					X*		X				X		X	
Develop training curriculum								X	X	X	X			
Develop plan for provision of patient care								X	X	X	X			
Develop patient survey tools				X	X	X	X							
Translate surveys into Igbo language							X	X	X	X				
Clinic inauguration											X			

[a]Phase 1, to be completed December 2015.

APPENDIX B

DATA COLLECTION

Variables	Instruments	Data collection point	Data analysis
Patient satisfaction	Investigator-designed survey	Daily	Descriptive
Knowledge acquisition	Investigator-designed tool/pre- and post-test	Upon completion of education and at 1 month, 3 months, 6 months, and 1 year after class	Descriptive/quasi-experimental

APPENDIX C

KCMC INVOLVEMENT LEVELS

Involvement level	Team member	Role
Knowledge creation and distillation Diffusion and dissemination End user adoption, implementation, and institutionalization	• Darcy Hostetter-Lewis • Uchechi Nwosu-Iroha • Dave Chesterman • Sandra Chesterman	• As a nursing instructor at California State University, Chico, Darcy Hostetter-Lewis was inspired by Kristina's global vision of nursing, which was the impetus behind this project. She will participate in every level of the project implementation and operation. • Uchechi Nwosu-Iroha is a registered nurse who graduated from the BSN program at California State University, Chico in December 2009. Having grown up in a city near where the facility is to be located, she has an in depth knowledge of the culture as well as of the health care needs of those who will be served by the clinic. Because the clinic will be located in her community she is committed to ensuring the clinic is completed and evidence based care is provided. • Dave Chesterman is a Civil Engineer with a strong background in project management. As Kristina's parents the Chestermans will be integral in the project during construction and throughout operation.
Diffusion and dissemination	• Judee Schmidt • JayaMae Gregory	• Judee Schmidt is currently working as a project coordinator at Stanford Medical Center in Palo Alto, California. A graduate of the Health Care Administration program at California State University, Chico, Judee is an expert in program development and implementation. Her current position is with the Quality Department however she also has experience in Human Resources, Employee Health and Education and Training. She excels in the development of tools and the organization of data; she also excels at research and has a tremendous ability to follow a project through from beginning to end. • JayaMae Gregory is a registered nurse who works in critical care at Feather River

Involvement level	Team member	Role
		Hospital in Paradise, CA. A graduate of the BSN program at California State University, Chico, Jaya is passionate about her hobby of endurance horseback riding, In addition to her work as a nurse she runs two charitable organizations and owns a horseback riding school. Jaya was chosen for the team because she has a tremendous amount of energy and she is consistently driven to embark upon projects that she believes make a difference. She brings to the team the knowledge and ability to organize and promote fundraising events.
Diffusion and Dissemination End user adoption, implementation, and institutionalization	• Scott Garner • Noelle Jahn • Mary Van Pelt • Kayla Kriech	• Scott Garner is a graduate of the Vermont Law School, and he has joined the team in order to provide legal advice and ensure that all government legal requirements are met. Because the KCMC team will be fundraising a legal expert is needed to ensure that all actions are legal and ethical throughout both the diffusion and implementation stages of clinic development. • Noelle Jahn is a former nursing student from California State University, Chico. Noelle has already been involved with the Upon This Rock Medical Centre in Nigera, the sister clinic to the KCMC. Noelle brings knowledge as to the workings of the current clinic as well as a passion for caring for the people of Ozu Abam, Nigeria. She has an existing relationship with our partner, James Umekwe, which will be helpful to group communication. • Mary Van Pelt is a registered nurse who has been involved in multiple mission trips. Because her daughter died from a congenital birth defect when she was 18 months old, Mary feels connected to the project's mission to bring health care to underserved children as well as a strong sense of empathy for Kristina's parents. Mary has a very positive personality and her organizational skills along with her ability to source cost effective supplies will help the clinic meet its

Involvement level	Team member	Role
		budgetary goals. • Kayla Kreich was a close friend and classmate of Kristina. She has been an integral member of the team since the clinic was proposed and her diligence has ensured that each fundraiser has been a success.
Ancillary members: varied involvement levels	California State University, Chico nursing students	The nursing students as stakeholders in the project have served as the primary workforce for all fundraisers. Their contribution is expected to fluctuate throughout the clinic planning and implementation phases.

APPENDIX D

KCMC BUILDING ESTIMATED

MATERIAL AND LABOR COSTS

S & J ENGINEERING LIMITED DEALING ON BUILDING CONSTRUCTION/BRIDGES, FILLING STATIONS, DRAINAGE ETC			
QUOTATION OF MATERIALS & LABOUR			
Material	Cost	Quantity	Total
Block	150	4500	675000
12mm Rod for pillars	1350	130 length	175500
2/3/12 plank	300	150	5000
Cement	1900	270	513000
Sharp sand	18000	12 trips	216000
Filling sand	10,000	80 trips	800,000
Cheapen	200,000	4 trips	800,000
1/12/12 plank	1000	100 length	100,000
5/16 Rod	700	50 length	35,000
3 inches nail	6000	1 bag	6000
Banding wire	5500	1 roll	5,500
Gp tank	40,000	2	80,000
Water	5000	10 tanks	50,000
Transport	1000		100,000
Labour	1.200000		1.200000
TOTAL			4,101000
FROM D.C.P TO LINTLE LEVEL			
Block	150	6000	900,000
Sharp Sand	18,000	12 trips	2,16000
Cheapen	200,000	2 trips	400,000
2/3/12 plank	300	50length	15,000
1/12/12 plank	1000	120 length	120,000
Cement	1900	150 bags	285000
12 mm rod	1350	160 length	216000
5/16 rod	700	50 length	35,000
Banding wire	5500	2 rolls	11,000
3 inches nail	6000	2 bags	12,000
2 inches nail	7000	1 bag	7000
Water	5000	10 tanks	25,000
Transport	100,000		100,000
Labour			1,000000
TOTAL			₦3,234000

DOORS			
3 main doors glass	40,000	3	120,000
Wood frames	5000	27	135,000
Doors	15,000	27	405000
Hinches brass	1000	30	30,000
Key for doors	5000	30	150,000
1 ½ inches of nail	10000	1 bag	10,000
Boot	500	60	30,000
Transport	50,000		50,000
Labour	200,000		200,000
TOTAL			₦1,100.000
WINDOW WORK			
Amaco glass window	40,000	36	1,440000
Protector	10,000	36	360,000
Transport	30,000		30,000
Labour	100,000		100,000
TOTAL			₦1,930000
PLASTERING AND FLOORING			
Cement	1900	270, bags	5,13000
Plastering sand	30,000	18 trips	540,000
Sharp sand	18,000	6 trips	108000
Central anan	25,000	6 trips	150,000
Water	5000	10 tanks	50,000
Transport	15,000		15,000
Labour			1.200000
TOTAL			₦2,576000
ZINC FOR THE ROOFING			
Long span step tiles			₦3,000.000
TOTAL			₦3,000.000

MATERIAL	TOTAL
Block	12500
Cement	8040 bags
Rod 12mm	430 length
5/16 rod	100 length
Binding wire	3 rolls
Sharp sand	34 trips
Plastering sand	18 trips
Cheapens	6 trips
Central anan	6 trips
Filling sand	80 trips
G.P TANK	2 tanks
Water	33 tanks
1/12/12 plank	220 length
2/3/12 hard plank	750 length
2/3/12 soft plank	620 length
2/4/18 plank	550 length
3/3/12 plank	220 length
1/10/12 plank	100 length
Owen battin	40 bundles
Ceiling board	400 pierces
3 inches nail	11 bags
4 inches nail	2 bags
1 ½ nail	4 bags
Copper nail	3 bags
2 inches	2 bags
Fan huk	20 pierces
Doors	30
Frame	27
Hinches	30
Door bolts	60
Amaco window	36
Window protectors	36

FROM LINTER TO LEVEL			
Block	150	2000 pierces	300,000
Cement	1900	150 bags	190000
Sharp sand	18,000	4 trips	72,000
12mm rod for chaining the level	1350	140 length	189,000
Water	5000	3 tanks	15,000
Banding wire	5500	1 roll	5,500
3 inches nail	6000	1 bag	6000
Transport	50,000		50,000
Labour	500,000		500,000
TOTAL			₦1,36000
ROOFING			
2/4/18 plank	800	550 length	440,000
3/3/12 plank	700	120 length	84,000
2/3/12 plank hard	300	550 length	165000
3 inches nail	6000	4 bags	24,000
4 inches nail	6000	2 bags	12,000
2/4/12 plank	400	200 length	80,000
1/10/12 plank	1700	100 length	170,000
Wire	3000	20 rolls	60,000
Transport	70,000		70,000
Labour	600,000		600,000
TOTAL			₦1,705000
CEILING WORK			
2/3/12 soft plank	300	620 length	217,000
Ceiling board	1000	400 pierces	400,000
Battin / owen	10000	40 bundles	400,000
3 inches nail	6000	4 bags	24,000
2 inches nail	7000	2 bags	14,000
1 ½ inches nail	10000	3 bags	30,000
Copper nail	10000	3 bags	30,000
Fan huk	500	20 pierces	10,000
Transport	70,000		70,000
Labour	400,000		400,000
TOTAL			₦1,195000

APPENDIX E

KCMC WORKSITE PHOTOGRAPHS