

Grand Valley State University ScholarWorks@GVSU

Honors Projects

Undergraduate Research and Creative Practice

12-2018

Analysis of Maternity Practices in Ghana with the Implementation of Telemedicine

Pierce Henderson

Grand Valley State University, henderpi@mail.gvsu.edu

Follow this and additional works at: <https://scholarworks.gvsu.edu/honorsprojects>

 Part of the [Medicine and Health Sciences Commons](#)

Recommended Citation

Henderson, Pierce, "Analysis of Maternity Practices in Ghana with the Implementation of Telemedicine" (2018). *Honors Projects*. 712.
<https://scholarworks.gvsu.edu/honorsprojects/712>

This Open Access is brought to you for free and open access by the Undergraduate Research and Creative Practice at ScholarWorks@GVSU. It has been accepted for inclusion in Honors Projects by an authorized administrator of ScholarWorks@GVSU. For more information, please contact scholarworks@gvsu.edu.

Pierce Henderson

Linda Chamberlain

December 9, 2018

Analysis of Maternity Practices in Ghana with the Implementation of Telemedicine

Introduction

In Ghana, there is a culture influenced by a long history of traditional and spiritual practices concerning medicine (Aziato, Ohemeng, Omenhyo, 2016). These practices are engrained in children at a young age, with many children experiencing and therefore knowing many herbal remedies to illnesses, such a ginger for colds. This trust in such a long preserved system of beliefs has resulted in a distrust in westernized medicine. This distrust in doctors and drugs has somewhat dissipated over the years, however most Ghanaians are still skeptical and much more willing to trust a traditional healer, who is frequently a friend, or a member of one's church, and not outside their community. This skepticism has created healthcare challenges, with people frequently waiting to the last minute before they will resort to seeing a doctor, especially for the medical indication of maternity. Mothers frequently don't go to hospitals, evident in the fact that fifty-three percent (53%) of births are not attended by skilled personnel (Wilkinson and

Callister, 2010). When mothers do go to the hospital many show up without any prior antenatal checkups, which increases the probability of complications for both the mother and the baby, potentially even death. I experienced an example of this while participating as in intern in Study Abroad during the summer of 2018, at the trauma hospital in Winneba Ghana. A mother came to the clinic a week after



her due date. The mother wished to have her baby naturally at home, but as of her clinic visit had not progressed into labor. She did not trust doctors, but decided to visit one after waiting for so long for labor to start. Sadly, the mother was too late in her decision, and lost her baby as a result. Had this mother been taken care of by a more qualified professional or had access to better health care information, this tragedy may have been avoided.

Since 1960, infant mortality in Ghana has dropped from 127 deaths per 1000 live births to 35.7 deaths per 1000 live births (UN Inter-agency Group for Child Mortality Estimation (UN IGME), 2017). This drop can be attributed to the increasing acceptance of western medicine and although significant, is still far from the 5.7 deaths per 1000 live births in the United States (UN IGME, 2017). The relevance of this statistic is that there are seven times more infant deaths per year in Ghana than in the United States. As if this isn't terrible enough, the under-five mortality rate is 49.3 deaths per 1000, which is nearly seven times the under-five mortality rate of the United States, demonstrating that *children's* health care in Ghana is equally challenged. This contrast between the mortality rates in the U.S. and Ghana exists because of a lack of education, lack of accessibility to adequate care, and a cultural bias to maintain native medical practices, encouraged by ignorance to modern medicine and comfort with Ghanaian tradition. This lack of education on western healthcare practices is due to the continued heavy reliance on traditional herbal medicine and a Ghanaian population that is unable to afford higher education, since it is not subsidized by the government like primary and secondary education. Another major problem is the lack of accessibility to adequate health care. Many people live in rural communities where there is not access to doctors or nurses. Some of these communities are visited by outreach clinical professionals every couple of weeks, while some are not visited at all. This prevents people from receiving the professional care they may need, furthering dependencies on

traditional healing remedies. Another challenge to accessing health care is lack of transportation. Cars are too expensive and taxies charge exorbitant amounts of money or may not want to travel the unsafe and unpaved roads in these town and villages. Transportation by ambulance for emergencies is almost impossible with only fifty-five (55) working ambulances in all of Ghana to service 29 million people (Nunoo, 2018). This lack of accessibility to healthcare and healthcare education can be significantly alleviated through application of telemedicine.

Telemedicine is “the delivery of health care services, where distance is a critical factor, by all health care professionals using information and communication technologies for the exchange of valid information for diagnosis, treatment and prevention of disease and injuries, research and evaluation, and for the continuing education of health care providers, all in the interests of advancing the health of individuals and their communities” (World Health Organization). Telemedicine is a method of using information technology to better clinical outcomes. This paper will specifically examine the similarities and differences between maternity practices in Ghana and the U.S., and identify how telemedicine can be used to improve these practices.

Methods

Through the use of formal and informal interviews of medical professionals in the Winneba region of Ghana, data was collected concerning maternity practices and how telemedicine is currently practiced in Ghana. Three formal interviews were conducted one-on-one with an orthopedic surgeon, head nurse, and general doctor. These interviews were done at the medical professional’s facilities and either recorded and transcribed or just scribed based on their level of comfort in being recorded. Non-formal interviews were also done with interview notes documented at a later time. Prior to engagement, GVSU IRB determined this research was

exempt, as those to be interviewed were not at any risk and the questions they were being asked were not personally sensitive. While in Ghana, the research topic developed and some of the interview questions changed, but remained without the risk of compromising those interviewed. These interviews were next synthesized with peer-reviewed literature sources found citing “Ghana,” “Maternity Practices,” “Telemedicine,” and “E-health”. Used together the intention is to create a current snapshot of what telemedicine looks like in Ghana and how it can be deployed to aid maternity practices, creating a more efficacious medical system model.

Literature Review

In a culture in which “Ghanaian women share a sense of rich spiritual significance in having a child, and that childbearing is a key element in social respect and hierarchy” (Agovi, 2003) it is evident that maternity is sacred. Due to these established beliefs, protecting woman by enabling them to give birth in the safest manner and place is paramount in the Ghanaian healthcare system. Through telemedicine there is a huge potential for how maternity practices may be changed because “the use of technology to deliver quality healthcare has been demonstrated as an effective way of overcoming geographic barriers to healthcare in pilot Telemedicine projects”(Tchao, Diawuo, Ofosu, 2016). This is particularly useful for communities in rural and remote areas who have no access to adequate care. People in these communities are frequently underserved because the few ambulances can’t reach them and the doctor to patient ratio is “1:23,456 in urban and rural areas respectively” (Tchao, Diawuo, Ofosu, 2016). Helping clinically deprived communities is not the only aim of telemedicine. Telemedicine will also help in major cities as utilization will reduce the number of people who visit the doctor as many medical concerns can be treated by a simple prescription, eliminating the long wait times that are prevalent in the Ghanaian healthcare facilities. A paramount challenge to

the delivery of telemedicine in Ghana is technology access. The ability to implement a nationwide telemedicine program has been set back by inadequate technology bandwidth; “The data rates provided by the existing 3G networks in outdoor locations in Ghana currently is inadequate to support the major Telemedicine applications” (Tchao, Diawuo, Ofosu, 2016).

Existing Telemedicine Applications

Telemedicine is still a very new concept in Ghana. There are currently several pilot applications, all with the goal of using information technology to improve medical practices. The main focus of these projects is on diagnostics and consultations. The Millennium Villages Project (MVP) is one of the most notable telemedicine projects in Ghana. The MVP has been piloted in 23 villages, tackling the rural healthcare issues as noted above. The aims of the MVP pilot are, “(i) reducing transportation time and healthcare costs for patients and their families, (ii) increasing medical knowledge and safety in primary healthcare facilities, and (iii) strengthening local capacities in e-health within the cluster of villages” (Tchao, Diawuo, Ofosu, 2016). To accomplish the above goals of the pilot project, information and communications technology (ICTs) are being used. These ICTs provide healthcare professionals the ability to instantly consult with larger facilities, such as the regional and national hospitals, which have specialists that can help in various medical capacities. This is a popular form of telemedicine and is still being implemented throughout Ghana, with the basic objectives of scaling through existing healthcare systems (Tchao, Diawuo, Ofosu, 2016). Scalability is critical because eventually Ghana wishes to be able to upgrade and have functionalities that will work to create basic Medical Information Systems (MISs) and patient Electronic Health Records (EHRs).

A major problem that healthcare professionals have with the established system is that it relies “heavily on paper-based registers for collecting data, which are time consuming to use and

limited as a tool for analyzing patient population health. Midwives need tools that allow them access to accurate and complete data regarding their patients” (Velez, Okyere, Kanter, Bakken, 2014). This was a recurring theme I encountered while in Ghana. Patients would come with a problem and the doctor had no records of the patient’s history because the patient lost their medical history book, since they generally keep these at home and not at the doctor’s office. During my internship the only medical facility I observed with EHRs was the regional hospital of Winneba, which they had only since the spring of 2018. Therefore, this was a new system for them and still wrought with many errors, taking hospital staff significantly longer to complete than the traditional pen and paper method of record keeping. However I also observed that this EHR method did allow midwives to review their patients’ information prior to visits which was helpful to their practices.

These observations are similar to what is documented from a descriptive usability study done with Ghanaian midwives using mClinic “an eHealth delivery platform that captures data for managing patient care as well as program evaluation and monitoring, decision making, and management” (Velez, Okyere, Kanter, Bakken, 2014). This study involved seven midwives in the Bonsaaso region of Ghana. Testing was done in the midwives medical facilities outside regular hours, but in some instances patients were attended to in the healthcare facilities during mClinic evaluation. Information was entered and accessed through phones because “Mobile phones require much less electricity than computers, making them preferable in rural clinics that rely on solar power for energy” (Velez, Okyere, Kanter, Bakken, 2014). This descriptive usability study was designed with the intent to evaluate usability issues with mClinic through evaluating the software used, usability questionnaires, and rapid prototyping of ideas to improve the system proposed by the midwives. To be informed of any problems that may arise or hinder

the midwives, the midwives were questioned on their thoughts and opinions concerning mClinic. These interviews were enlightening as to how information technology will improve medical practices, but also the struggles that may accompany it. The midwives agreed that mClinic would be very useful in the long run, however the current ease of use was low, which could be linked to low technical self-efficacy of the midwives. “The opportunity to rapidly collect and aggregate data will improve our understanding of patients and allow for rapid targeting of needed resources and interventions” (Velez, Okyere, Kanter, Bakken, 2014). This is important because it can possibly be used to determine some recurring factor(s) that leads to maternal and infant mortality in Ghana.

Telemedicine within the United States is a much more established field than that of Ghana, yet still in its early stages. Originally many telemedicine applications were to aid the military, however, now these applications have branched into fields such as maternity. This is increasingly relevant as maternal mortality increases throughout the U.S. with 23.8 deaths per 100,000 live births in 2014, compared to 7.2 deaths per 100,000 live births in 1987 (Kronenfeld, J. J, 2016)(Marian F. MacDorman, Eugene Declercq, Howard Cabral, and Christine Morton, 2016). This more than tripling of the number of infant deaths in the U.S. is a concerning rise when many of these could have been prevented by better practices. Maternal mortality is defined as “the death of a woman while pregnant or within 1 year of pregnancy termination – regardless of the duration or site of the pregnancy – from any cause related to or aggravated by the pregnancy or its management, but not from accidental or incidental causes” (CDC). There are suggestions on how to lower this statistic, such as: implementation of AIM bundles (Alliance for Innovation on Maternal Health, which contain readiness, recognition, response, and reporting protocols), multidisciplinary staff meetings to access patient risk factors, simulation of

obstetrical emergencies in the labor and delivery unit, as well as using the Maternal Health Compact (Susan Mann, M.D., Lisa M. Hollier, M.D., Kimberlee McKay, M.D., and Haywood Brown, M.D. 2018). Another possible solution may be unlocked through the use of telemedicine.

Frequently mothers return home after giving birth and begin to feel ill, or encounter strange side-effects of their pregnancy and attribute it to giving birth, when actually the condition may be much more dire. Through telemedicine, specifically the use of text messaging, these complications may be diagnosed and treated before they are fatal. In Elisabeth Poorman, Julie Gazmararian, Ruth M. Parker, Baiyu Yang, Lisa Elon, *Use of Text Messaging for Maternal and Infant Health: A Systematic Review of the Literature*, forty-eight articles were used to examine how text-messaging drove improvements in clinical outcomes for pregnant woman. They theorized that text messaging as a growing medium would be a useful tool to engage both difficult to reach populations, as well as pregnant women because they are likely to use text messaging. It was discovered that two-way messaging systems had more success, which is key to allowing mothers access to question medical professionals and receive responses to their concerns with postpartum ailments, potentially saving some new mothers from becoming a statistic. This is a great solution since “women are traditionally more difficult to reach with traditional communication methods, and thus this technology may be particularly valuable for this population” (Elisabeth Poorman, Julie Gazmararian, Ruth M. Parker, Baiyu Yang, Lisa Elon, 2014).

There are further examples of telemedicine being applied to improve maternity practices within the U.S. A notable example of this is Midwest Maternal-Fetal Medicine (MFM), a St. Louis-based group of high-risk obstetricians. MFM tripled the number of consultations to assist patients in rural communities. They used telemedicine consultations to provide healthcare from a

distance, specifically with real-time ultrasound evaluations. This addresses one of the main issues faced in Ghana, namely travel costs, because it “saves those patients the cost and time of driving to our main office. And, more importantly, it gives them the peace of mind of getting expert support without waiting long periods of time” (MFM). This could be useful because patients may receive an ultrasound that is concerning, but may not have access to a qualified professional to analyze what it means for them. With this telemedicine technology they can talk directly with a qualified healthcare professional about what the results mean and determine what actions are needed to alleviate the issue. Another example of telemedicine in use is presented in the Obstetric Hemorrhage Collaborative, conducted in 2017. This program focused on teleconferencing with an expert mentor twice a month over six months, with the goal of implementing obstetric hemorrhage patient safety bundles. As a result of these teleconsultation lessons “All participants (100%) reported that teleconferencing sessions were “very helpful,” and 14 (93%) were “very satisfied” with the Collaborative” and “Utah hospitals report improved implementation of an obstetric hemorrhage bundle as result of a novel educational program using telemedicine” (Brett D. Einerson).

These teleconsultations may be useful in both serving patients and further teaching doctors in Ghana. Comparing telemedicine opportunities in the U.S., Ghana, with very high cell phone utilization rates, could possibly implement text messaging methods for mothers who are expecting or have delivered, to remind them to come in for a checkup, or discuss any complications. As a result of this people would be able bypass hospitals and clinics for less immediate problems. In addition to this, teleconsulting does not have to only consist of solving the problem at hand, but it could also be a means of teaching doctors or nurses in rural community’s new medical techniques and improve their knowledge in areas they are not familiar

with. Frequently nurses are sent out into these rural communities and tasked with alleviating assorted issues. Many times they encounter new and unfamiliar signs and symptoms of obscure illnesses, which require the assistance of more qualified individuals who can't make it to the patient and vice versa. Teleconsulting can thus be utilized to teach this medical professional how to aid this patient. Similar to the U.S., Ghana could work to support maternal care by providing remote areas, far from hospitals, with ultrasounds so that mothers can be examined prior to the birthing process. Early and proper identification of complications can be dealt with more efficaciously and appropriately. Through telemedicine, the ultrasound films could be reviewed by qualified professionals, which will be enabled as all regional hospitals integrate telemedicine facilities. Lastly resources need to be allocated so when an individual cannot be treated by telemedicine they can be helped swiftly and efficiently. This requires more than the grand total of 55 Ghanaian ambulances. Whereas the nation's government has pledged to fix this gross issue, the actions have not demonstrated as of yet.

Interviews

Critical to my evaluation of the existing telemedicine practices in Ghana are the interviews I conducted while working in healthcare environments in Winneba. These interviews were both formal and informal, and conducted with medical professionals. Those interviewed were guaranteed anonymity and asked to answer questions about what medical practices are like in Ghana. The questions changed throughout my time spent in Ghana, as I reevaluated my research topic. I used a structured template to transcribe the interview. The relevance of this research is that those who I interviewed are key stakeholders to realizing the potential of telemedicine and will benefit from implementation in the future. There were three formal interviews conducted: 1) a head nurse, 2) an orthopedic surgeon, and 3) a general practice

doctor. All three agreed that telemedicine was the future of medicine and would be tremendously helpful in countries like Ghana where it can be extremely difficult for those in rural areas to reach hospitals.

The general practice doctor provided some of the most articulate insights into the application of telemedicine especially in reference to maternity. This doctor described how there are many issues within the Ghanaian healthcare system because of a lack of resources. One of the major problems is that there are no written records of patients' history. As a result of this, the doctor had to make a booklet for patients so that when they return for another visit, he could reference their past vitals. This book was helpful, however patients could and would lose it, or it could and would be destroyed through wear and tear. The doctor believed that this issue could be eliminated through the use of technology, with the added benefit that the information could be sent to other hospitals – and discussed- if the patient needed to be transferred. In addition to this, the doctor was enamored with the idea of telemedicine because he said he did not have all the answers to medical problems and ran into patients with problems where he needed a specialist's opinion. He believed he could receive these opinions through telemedicine. The main concern of this medical professional was that as much as he desired telemedicine, there are other medical instruments that he more urgently needed. "There are greater priorities for basic instruments to examine eyes, nose, and ears, or ultrasound machines and incubators in regards to maternity". His concerns exemplify that telemedicine has huge potential, however will not solve all the problems that need to be addressed in healthcare in Ghana.

Further insights were provided by the surgeon. The surgeon touched on how telemedicine is more than healthcare communication, rather also a means of providing education. He described how there exists within Ghana a huge emphasis on herbal remedies, some of which

work, but frequently only solve the problem partially or not at all, such as when a bone breaks. Many of these practices are pushed by spiritual healers with no knowledge of herbs or medicine, and end up doing more harm than good. In his eyes telemedicine could be used to work with herbal traditionalist healers to teach them that there is no evidence behind many of these herbal concoctions, or show them how to improve them, so that people may come to the hospital before their malady is too bad and be treated with what he called orthodox medicine. He elucidated that because of the lack of resources in Ghana he viewed telemedicine more as bringing medical knowledge closer to the rural people, not necessarily transferring patients to the cities for treatment. Furthermore he specified that telemedicine would never be the sole future of medicine, rather a supplement because it saves time, costs, and is very accessible. People from rural areas can receive telemedical help at their local Community-based Health Planning and Services (CHPS) facility, where they can give their symptoms and the local health professional can call to the regional hospital and talk to a more qualified medical professional.

The nurse discussed that the goal of the nurse in maternity is to ensure that both the mom and baby make it home together. She mentioned how in Winneba they are low on many of the resources that help enable them to accomplish this such as instruments to provide the baby oxygen, suction to remove amniotic fluid at birth, and incubators, which are for the most part out of service. She explained how medical practices have improved the birthing process, resulting in a lower infant mortality, but how compared to the developed world Ghana is still behind. A major issue she encountered in maternity is that many mothers are illiterate and can't read the help book they are provided when their child is born. Due to this, the mother doesn't know what to do when certain problems may occur, which is why the nurses have to go out of their way to teach mothers the proper safety precautions. When asked about the state of telemedicine in

Winneba, it became evermore evident that telemedicine is a work in progress, with healthcare providers and patients just learning what it is, with their facilities receiving numbers to call if the local medical professionals have exhausted all resources and are in need of help. Overall she saw a great future in telemedicine especially for those far from the major cities.

While in Ghana I was also given the wonderful opportunity to attend a telemedicine workshop held within the regional trauma hospital in Winneba. I attended this workshop July 12th, 2018, three weeks after the teleconsultation center (TCC) had been opened at the hospital. The goal of this workshop was to familiarize local doctors and nurses with telemedical terms, and how this would benefit medical professionals, as well as inform them on how their TCC would be run. They stated the goal of telemedicine at the facility was to overcome geographical boundaries and improve clinical outcomes through teleconsultations, which are between the patients and doctors, or other health workers. If necessary, the doctor then consults with other health professionals, which is referred to as tele-counseling. The goal of the Ghana Ministry of Health (MOH) is for telemedicine to cover the entire country, with TCC's at each regional hospital. These centers, as I witnessed firsthand, are fascinating. The TCC's run 24 hours a day, seven days a week. These centers have backup power in case the power goes out, and have phones, tablets, and computers that have software to record each conversation. These centers are veritable homes, with kitchens to feed the call operators, beds to sleep on and a TV to watch while waiting for calls. All of this to ensure comfort so that the healthcare professionals can help to the best of their abilities. Each facility and its workers are provided telemedicine protocols to follow for cases such as antepartum hemorrhage and diarrhea, all to ensure that no matter what the problem a solution can be found. The goal of the TCC's is to insure that through telemedicine and the established protocols, there will be better access to quality, economical medical care,

reducing the stress of the patient and healthcare worker, and improving communication not only between patient and doctor, but between health facilities.

Conclusion

The central goal of this research paper was to examine maternity within Ghana and the U.S. and compare and contrast them to see how telemedicine is, or could be used to improve clinical outcomes. It is evident that telemedicine is in its infancy in Ghana, with many opportunities to improve healthcare delivery. However, without improvements to the fundamental healthcare infrastructure of Ghana it may be difficult to positively impact maternal and infant mortality rates to match those of the U.S. An important component to improving healthcare is establishing means to increase the level of maternity resources at facilities, as well as address bad roads leading to facilities, and the availability of ambulances to get patients there. It would be demoralizing to have telemedicine make a mother aware of a serious issue that requires professional medical attention, but they cannot access help because the roads are unkept and or there is no ambulance to get them to help. Therefore, infrastructure improvements alongside information technology systems will be needed to better clinical outcomes, by enabling mothers, 24/7, seven days a week, to get assistance from doctors in the comfort of their own home or a nearby clinic. Mothers will have the peace of mind that their pregnancy is progressing well and that the care they are receiving is by qualified professionals. When issues arise and a birth is going precariously, telemedicine just maybe the solution to saving a mothers and/or newborns life. Telemedicine has many great possibilities, however it must first be coupled with improvements to Ghanaian infrastructure, healthcare resourcing, and then implementation throughout most healthcare facilities before the long-term positive outcomes are realized.

Appendix

Interview 1

| |
|---|
| Ghanaian Nurse |
| Estimated Age: 20-30 |
| Gender: Female |
| Primary Goal of this interview: The primary goal of this opportunity is to gain insight on how maternity is dealt with at this facility. In addition, to examine any implementations of telemedicine in this clinic. |
| How does conducting this interview reflect on your project? This interview provides primary data from individuals who deal with maternity every day and can describe the methods in which it is handled in an objective step by step process. |
| Important insights: <ul style="list-style-type: none"> ● The emphasis in her clinic is on preventing infant and maternal mortality ● Many mothers can't read the books they are given on maternity and what to do if something goes wrong with their child, so it is up to the nurses to explain to them what to do if something goes wrong ● Antenatal care is free from conception to birth and up to three months after through maternal insurance, or covered by the government. Antenatal education is still underutilized. |
| Dialogue Questions and Response: <p>1. What are your roles and duties at this medical facility?</p> <p>I am the head nurse at the clinic, meaning I am in charge of all the other nurses. I am more experienced than many of the nurses and delegate duties and supervise them.</p> <p>2. How is maternity viewed in Ghana?</p> <p>When women come to deliver the emphasis is that the mother and baby go home alive. We don't let one go home and leave the other behind. The emphasis is on preventing infant and maternal mortality. Sometimes the district sets goals of having, say zero maternal deaths. This is the goal but sometimes things happen and this does not get achieved. There are not enough ambulances to help get mothers to the hospital.</p> <p>3. What resources is maternity in need of?</p> <p>Oxygen supply, medications, tools to help suction out fluid from babies mouths, and lifesaving technology such as incubators, which he don't have any since they are broken. We need a lot more modern equipment. We need to teach midwives basic lifesaving skills to help the mother</p> |

and baby in cases of emergency. Integrated Management of Neonatal and Childhood Illnesses is very important to us and key to improving mortality because it caters to children 0-5. Many mothers can't read the books we give them on this and what to do if something goes wrong with their child, so it is up to us to explain to them what to do if something goes wrong.

4. How similar are the above treatments to the methods used by medical professionals in the U.S?

I am not too familiar with American practices, but from what I know we do things in a similar way.

5. Describe to me how homeopathic medicine is utilized in Ghana? Under what circumstances is homeopathic medical treatment asked for by a Ghanaian patient?

It is an alternative form of medicine that is used here. There are so many healers who come from churches and are faith based, so who is qualified and who is not is very difficult to know. We try to go to them and try to get them to come to us and either learn some skills, or send their patients here when it is beyond basic traditional treatments. These healings can work, but it depends. Some do and some don't.

6. Describe the system of telemedicine at your medical facility. How is this system used, and for what treatment methods?

Currently telemedicine is something that they've started, they have just started to train people on how to use it and they have come up with some protocols on what to do in certain scenarios. For instance, say there is a case where I have tried everything I can for a person and I am not in a capacity to help them further. They have given out a number where we can communicate with a specialist on what to. You explain what you have done and they suggest alternate ways to help them and whether you should transfer them or not. Telemedicine is just beginning, but will be very useful in the future, and at the same time the resources aren't exactly there but we should give it a try. It will really assist those who are out in the bush, before they come to a larger hospital.

Stakeholder response to "what is the one thing I didn't ask you that you think I should have?"

Most of the time women just stay in their house till it is time to give birth and don't come in for checkups. This is a very important process to get the baselines and ensure that the mother and child are healthy. Antenatal care is free through maternal insurance, covered by the government, but the lack of antenatal education is sad because it is free from conception to birth and up to three months after.

Possible next-steps:

- Look more into infant and maternal mortality
- Examine the similarities and differences in opinions regarding telemedicine from different medical professionals
- Think of creative ways to help teach mothers when they are not face to face with a nurse

Interview 2

| |
|---|
| Ghanaian Orthopedic Surgeon |
| Estimated Age: 50+ |
| Gender: Male |
| Primary Goal of this interview: The primary goal of this opportunity is to gain insight on how medical professionals at this facility treat high blood pressure and broken bones (initial focus of research). In addition, to examine any implementations of telemedicine in this clinic/hospital. |
| How does conducting this interview reflect on your project? This interview provides primary data from individuals who treat these common maladies every day and can describe the methods in which they are treated in an objective step by step process. |
| Important insights: <ul style="list-style-type: none">• Many people come to the orthopedic surgeon after homeopathic treatment of broken bones fails, but are already healed too incorrectly to help without invasive treatment• Almost everyone has a cell phone• Telemedicine cannot be the future for medicine, it can only be a supplement |
| Dialogue Questions and Response: 1. What are your roles and duties at this medical facility? My role is to supervise and take control to check patients and give them the required appropriate treatment. This is done in the male trauma orthopedic facility. 2. Explain the steps involved in monitoring and treating high blood pressure at your clinic/hospital in Ghana. I deal with bones, however I know we help by giving these patients medicine that helps stabilize and or lower it. 3. How are broken bones treated at this same facility? Treatment of broken bones depends on the nature of the injury, where it is involved, different possible treatments. Injuries are normally classified according to various things, according to various severities, which determines the treatments used. For a broken arm, depending if it is the shaft or joint injury, will determine how it is treated. Shaft usually is treated with a cast made of plaster-of-Paris. Those around the joint we operate around so that they are restored properly, using pins and plates. 4. How similar are the above treatments to the methods used by medical professionals in the U.S.? We treat the same way however the U.S. probably uses fiberglass cast, which we don't have. |

5. Describe to me how homeopathic medicine is utilized in Ghana? Under what circumstances is homeopathic medical treatment asked for by a Ghanaian patient?

A number of people come here after those things fail, but are already healed to poorly to help. It can work on shaft fracture, but will leave most people with deformities. All they are interested in is for the bone to heal. They either don't care or don't know if they need to restore function or length. They can't deal with joints or infections of the bone, such as osteomyelitis. Naturally orthodox medicine, which you refer to as western medicine, is becoming more prevalent. Herbal or traditional medicine is what is commonly called eastern medicine.

6. Describe the methods in which homeopathic medicine is used in treating high blood pressure and broken bones.

This is answered above.

7. Describe the system of telemedicine at your medical facility. How is this system used, and for what treatment methods?

We are now establishing telemedicine at all the hospitals in the region, in fact in the country. We started that last year in October and in fact it is still on-going. Telemedicine is bringing medical knowledge closer to the rural people, not necessarily transferring patients from the rural area to the cities for treatment, rather giving instructions and directives to be given so that patient can be treated no matter where he is. When there is the need they can be transported to other facilities already with those facilities being informed that they are coming, so they are prepared to receive and give treatment. This is done using technology like cellphone and computers. It cannot be the future for medicine, it can only be a supplement. It is very helpful because it saves times, cost, and is accessible. Almost everyone has a cell phone so they should call their CHPS (community health compounds) located in remote areas and this officer should call to a center and describe this patients concerns. This has now been established in every region and is now being disseminated into the rural areas.

Stakeholder response to "what is the one thing I didn't ask you that you think I should have?"

He was not sure.

Possible next-steps:

- Refocus my topic, orthopedics does not seem to be that different from the U.S. There are other areas of medicine that are quite different, such as maternity.
- Look into what CHPS facilities are
- Look at how telemedicine is used in rural communities

Interview 3

| |
|--|
| Ghanaian General Practitioner |
| Estimated Age: 20-30 |
| Gender: Male |
| Primary Goal of this interview: The primary goal of this opportunity is to gain insight on how maternity is dealt with at this facility. In addition, to examine any implementations of telemedicine in this clinic. |
| How does conducting this interview reflect on your project? This interview provides primary data from individuals who treat these common maladies every day and can describe the methods in which they are treated in an objective step by step process. |
| Important insights: <ul style="list-style-type: none"> ● Telemedicine does not have all the solutions, but it is the future according to the interviewee ● Thinks there should be more emphasis placed on providing clinicians the proper resources to treat patients before we invest in new technology ● At the heart of what the Ghanaian general practitioner does is very similar to how medicine is done in the U.S. |
| Dialogue Questions and Response: <p>1. What are your roles and duties at this medical facility?</p> <p>I am a general practitioner. I deal with a variety of different illnesses from diabetes, high blood pressure, the common cold, flu, malaria, gastrointestinal problems, and some maternity cases. I diagnose and treat these patients based off of their signs and symptoms with medicine.</p> <p>2. Explain the steps involved in monitoring and treating maternity related issues at your clinic/hospital in Ghana.</p> <p>Although I do not deal especially with pregnancy, I am often visited by pregnant women if they are experiencing any unusual conditions. I will check to see that her vitals are okay and if the baby appears to be okay, however I can only listen for it's heart beat and feel to see how big it is and in what position. I don't have the proper resources to perform checkups.</p> <p>3. How similar are the above treatments to the methods used by medical professionals in the U.S?</p> <p>At the heart of it, what I do is very similar to how medicine is done in the U.S., but how I do it is different. This is for a couple of reasons, mainly the lack of resources and technology. I do not have any instruments to look at my patients' eyes, nose, and throat, and if a baby is here they must be transported if they need an incubator. Without better technology it is hard to track a</p> |

patients' history in order to diagnose and treat them. I created books that patients can keep to help me and any other doctor they visit, yet these are easy to destroy and lose.

4. Describe to me how homeopathic medicine is utilized in Ghana? Under what circumstances is homeopathic medical treatment asked for by a Ghanaian patient?

Homeopathic medicine is widely used in Ghana; it is a cultural way of life that is slowly disappearing, but still prevalent. I can work with it, however those who practice this frequently are not qualified and as a result hurt the patient more than they help. These people won't take the blame for it and normally won't send the patient to us.

5. Describe the methods in which homeopathic medicine is used in relation to maternity?

I am not fully sure, but I know they give herbs, poultices, and good luck charms.

6. Describe the system of telemedicine at your medical facility. How is this system used, and for what treatment methods?

Telemedicine is just starting at my facility. I recently went to a conference where we were taught what it is and how it is done. We were provided a number to call if we need assistance in treating a patient. Telemedicine does not have all the solutions, but it is the future in my eyes. It will be able to assist those far from us and provide more rapid response treatment for those in need. I already provide my cell number to some patients and they use it to contact me so that they don't have to come in for simple issues, saving me time that can be devoted to helping those with more pressing issues.

Stakeholder response to "what is the one thing I didn't ask you that you think I should have?"

I think it is important to note that telemedicine is phenomenal. Unfortunately it will take a lot of time to implement before it works to its full capacity. I think there should be more emphasis placed on providing clinicians the proper resources to treat patients before we invest in new technology. This will be a more holistic approach that can then be incorporated into technology.

Possible next-steps:

- Find more qualified medical professionals in the maternity field
- Examine what resources medical professionals desire most

References

- Agovi, A. M. A. 2003. Just me and my God—Childbirth experiences of religiously motivated Ghanaian women, Knoxville: University of Tennessee, Knoxville.
- Aziato, L., Hannah, A. O., & Omenyo, C. N. (2016). Experiences and perceptions of Ghanaian midwives on labour pain and religious beliefs and practices influencing their care of women in labour. *Reproductive Health*, 13 doi:<http://dx.doi.org/10.1186/s12978-016-0252-7>
- Einerson, B. D., Baksh, L., Fisher, J., & Clark, E. A. S. (2017). Telemedicine to improve maternal safety: A statewide survey of hospitals in an obstetric hemorrhage collaboration [5OP]. *Obstetrics & Gynecology*, 129 Suppl 1, 2S-2S. doi:10.1097/01.AOG.0000513934.28823.08
- Kronenfeld, J. J. (2016). Maternal mortality. In C. L. Shehan (Ed.), *Wiley-Blackwell encyclopedias in social science: The Wiley Blackwell encyclopedia of family studies*.
- MacDorman, M. F., Declercq, E., Cabral, H., & Morton, C. (2016). Recent Increases in the U.S. Maternal Mortality Rate: Disentangling Trends From Measurement Issues. *Obstetrics and gynecology*, 128(3), 447-55.
- Mann, S., Hollier, L. M., Mckay, K., & Brown, H. (2018). What We Can Do about Maternal Mortality — And How to Do It Quickly. *New England Journal of Medicine*, 379(18), 1689-1691. doi:10.1056/nejmp1810649
- Nunoo, F. (2018, May 07). 29 million Ghanaians dey share 55 ambulances. *BBC*. Retrieved from <https://www.bbc.com/pidgin/tori-44030411>
- Poorman, E., Gazmararian, J., Parker, R.M. et al. *Matern Child Health J* (2015) 19: 969. <https://doi.org/10.1007/s10995-014-1595-8>
- Stephen Eugene Wilkinson & Lynn Clark Callister (2010) Giving Birth: The Voices of Ghanaian Women, *Health Care for Women International*, 31:3, 201-220, DOI: 10.1080/07399330903343858
- Tchao, E. T., Diawuo, K., & Ofori, W. K. (2017). Mobile telemedicine implementation with WiMAX technology: A case study of Ghana. *Journal of Medical Systems*, 41(1), 1-10. doi:<http://dx.doi.org/10.1007/s10916-016-0661-8>
- Vélez, O., Okyere, P. B., Kanter, A. S. and Bakken, S. (2014), A Usability Study of a Mobile Health Application for Rural Ghanaian Midwives. *Journal of Midwifery & Women's Health*, 59: 184-191. doi:10.1111/jmwh.12071
- Vélez, Olivia, et al. "A Usability Study of a Mobile Health Application for Rural Ghanaian Midwives." *Journal of Midwifery & Women's Health*, vol. 59, no. 2, 2014, pp. 184-191.