

My time in Arusha, Tanzania was an eye opening and life changing experience. I shadowed and volunteered at two clinics. I first worked in a rural clinic, the Arusha Dispensary. There I worked with Dr. Joshua and several nurses that were very friendly but they spoke little to no English. The clinic is located in a rural village twenty minutes outside the city. In this poor village, patients would go to the major hospitals in the city if they needed extensive care. People only went to the Arusha Dispensary for basic care and medications. At the clinic, there were few gloves, which were only used for emergencies and minor procedures. I was shocked to see that injection sites were not cleaned with an alcohol swab before hand. I was even more surprised to learn that the clinic would randomly lose power through out the day for two hours or more. Apparently, losing power for the majority of the day was the norm. We were told that the government would save resources by randomly turning of power in certain areas. The clinic consisted of only one exam room that was cleaned every evening but not after each patient. The bed in the exam room was covered with a bed sheet full of holes and covered with dry blood stains. It was interesting to see that the patient records were written on colorful cardstock. The patients would pick up their records and pay for their visit at the secretary's office. Next, the patients would wait in a line to see the doctor and after meeting with Dr. Joshua they would see the nurse for their injections. Finally, the patients would walk over to the pharmacy that my fiancé and I ran during our stay.

The most common procedure at the clinic was injecting patients with antibiotics: gentamicin and penicillin. The nurses would inject the medications in the back of patients' hands. Apparently, in Tanzania that is the first choice of injection sites because finding vein's in a patient's arm is difficult due to their dark skin color. The medical staff also explained that veins in the arm were more likely to 'roll'. At the clinic, I watched two minor procedures. A stab wound on a teenage boy's leg and a circumcision of a 6 month old.

I spent most of my time at the clinic in the pharmacy. My fiancé and I ran the pharmacy portion of the Arusha Clinic on our own for two weeks. We learned the typical doses for the few drugs available. The pharmacy would run out of drugs by noon and a man on a moped would deliver a box of medications every day around 1 pm. A typical patient would come to the clinic at 9 am to meet Dr. Joshua and be prescribed a medication. At times patients would have to wait until 1:30pm to receive their medications. There were only 12 medications in the clinic: paracetamol, co-trimoxazde, metronidazde, doxycycline, amoxicillin, ciproflaxin, omeprazole, erythromycin, malafin, labesten, and koflyn. The most commonly prescribed medications were malafin as a malaria treatment and paracetamol for pain relief and anti-pyretic. Health care was provided differently in Tanzania in aspects I was not expecting. The clinic did not have plastic bags to put loose tablets or pills in. One of the nurses thought of a creative idea to create newspaper pouches to put the dispensed medications in. Instead of simply wrapping the newspaper in a cone then placing the tablets in it, we created these 'fancy' newspaper pouches from templates she cut out. Glue was an expensive commodity, which she made herself and kept in an old plastic water bottle. We then used a piece of cotton to dispense the glue onto the newspaper to create the pouch. It was just interesting to see how basic health care was provided in this clinic. Creating these newspaper pouches

gave me a glimpse into the simple lives of the local people. It made me think of all the commodities I take for granted.

The second clinic I volunteered at was Kituj Cah Ha Ya Ngarengaro. This clinic was within the city or Medical District, run by Dr. Jeffery. This clinic was much more developed and allowed me to participate in unique experiences. The clinic was an entire compound with five different sections. The first section was an area where patients consulted Dr. Jeffrey. Adjacent to the doctor's office was the only ultrasound machine run by another doctor. The second part of the clinic was for children under five years old. The third section was for prenatal screening where nurses performed prenatal check ups, screened for HIV and syphilis, and provided necessary vaccines. The fourth section was a family planning section and the fifth section was the delivery ward. Through out the week and a half at the clinic I spent most of my time in the section for children five and under and in the prenatal section. In the clinic for children under five, I weighed infants and toddlers for routine check ups and completed medical charts. Each child had a cloth sling similar to the swings you see for young children at playgrounds. The mothers would put their children in this swing and literally clip them into the scale. I would weigh the children and write their weight on their mother's health record pamphlet. Then, after collecting twenty-five or so pamphlets I would hand the pile to one of the two nurses who would enter by hand all the information into the record book.

Afterwards, the nurses would call up patients to wait in line to see the physician. The problem with the pamphlet records is that the last person I weighed was first in the pile I handed the nurse. Therefore the last person I finished with was the first person to see the doctor so some families waited for longer periods of time than others. For this reason, patients would sit next to the nurses and nag them requesting to move their record closer to the top of the pile. It was interesting to see that each patient's health records were simply written on a trifold pamphlet that the patient kept without a back up copy at the clinic. This pamphlet contained information regarding the mother's vaccinations, pregnancy history, family history, lab results and other pertinent information. Most patients traveled several hours from rural and poor areas to see a healthcare provider. They had to take good care of this small pamphlet. Some women even placed it in a pillowcase to keep the pamphlet safe. If the mothers lose this pamphlet the clinic has no record of their past visits or their children's. In the section of the clinic for children under five, I also helped input patient names in a large record keeping books that the government had recently provided. The system was very inefficient but I was glad to see that soon the clinic will have back up copies of patient visits and records.

In the prenatal section of the clinic I performed prenatal check ups, measured gestation age of pregnant mothers, gave tetanus vaccinations, learned how ultrasounds were performed, and tested for HIV and syphilis. I start at the clinic at 8:00 am and there would be about seventy women waiting to see the two nurses for their check ups. The nurses would attempt to take the mothers in the order that they arrived. However, if a woman came later in the day with her husband she would automatically be moved to the front of the line. Tanzanian people believe that men should not have to wait and that men should have priority over the women. Each morning that I worked in the prenatal section, I would make slips with

numbers to give to the patients in the order they arrived. When the mothers came into the exam room, I would test their blood for HIV and syphilis and if needed I would give them a tetanus vaccine. When testing for syphilis the nurse would ask if the women had any miscarriages as a sign of syphilis. Pregnant mothers that were HIV positive were given fumarate and tenofovir disoproxil. HIV positive mothers' information was also recorded in a government book to keep statistics on positive patients. Every pregnant woman that came to the clinic was given five doses of the tetanus toxoid vaccine. After testing was complete, I would be left in charge of completing a miniature prenatal check up. I would check pregnant mothers for abnormal ankle edema, fever that could be a sign of malaria, the shape of the abdomen and linea nigra. To estimate gestation age the nurses would calculate the exact number of weeks to date from the patient's last missed period. Then we would measure from the pubic symphysis to the top of the fundus of the uterus. The length in centimeters estimated the average weeks of gestation. Every centimeter was equivalent to one week of gestation. After estimating gestation I would attempt to listen to the fetal heart by feeling around the mother's abdomen for the baby's back.

There were a few patients that neither the nurse nor I could hear a fetal heartbeat, so we suggested the mother have an ultrasound. This was a difficult decision for these mothers because they had an option to pay for a costly ultrasound. The nurse would advise them to go home and talk with their husbands about their finances and decided if they can afford an ultrasound. During my time in the prenatal clinic, I also learned the 8 'Danger Signs of Pregnancy'. The first warning sign is edema in the legs and ankles. The second is a fever, the third is severe lower abdominal pain and the fourth is smelly or bloody discharge. The fifth danger sign is epigastric pain, sixth is a first heart beat, seven is severe headaches, and eight is dizziness which can be a sign of anemia. The nurses also wanted to be sure that if the mother was more than twenty weeks along that they felt fetal movement. The most shocking thing I learned from this clinic is how nurses tell HIV+ moms to breastfeed regardless of their diagnosis. This was not preferable but formula would be too expensive for these women to afford and the risk from transmission through breast milk was low according to the nurses. It was shocking because in America, HIV+ mothers would not be told to breastfeed.

Dr. Shunguri, another physician at the clinic showed me how ultrasounds were performed. She measured from the top of the fetus' head to the chin. Then she measured the length of the femur to get an accurate measurement of gestation. Dr. Shunguri looked at the amniotic fluid, which should appear black, and then she would observe the placenta, fetal heart, and then check the mother's blood sugar. She also looked at the inside of patient's conjunctiva and she even looked at the pink-ness of the patient's palms to rule out anemia. Apparently, anemic mothers have less rosy palms. Dr. Shunguri seemed to be a mother-like figure to these young pregnant women. They asked her questions about how to care for a child and confided in her. It was also interesting to see how much these patients respected and needed health care. The women would wait for the nurses, physician, ultrasound, or lab results for an unknown amount of time. They may even wait the entire day to see the health care professional. In addition to waiting several hours for a few minutes of health care, I noticed a unique interaction between the health

care providers and patients. When the patient finally met their health care provider they would constantly be interrupted when other health care professionals coming into the room. At times even friends of the health care professional would randomly stop by to chat.

On the delivery ward, I saw my first delivery and I was reminded of the four stages of a delivery. The first stage is a fully dilated cervix. The second stage is the birth, the third stage is the birth of the placenta, and fourth stage is twenty four hours later during the recovery period. The pregnant woman in the delivery ward was not given any anesthesia just a simple saline IV. The mother was completely naked, groaning, and holding onto the IV pole.

I spent some time in the delivery ward, across the street from a private hospital, 'The American Luther Hospital'. There are private and public hospitals and clinics in Tanzania but most patients chose the public clinic for affordability. This modern hospital was large and fancy incomparable to any other building in the country. However, it was so expensive that most local people could not afford it. Patients only went to the Lutheran hospital if a local physician advised them to go due to their rare or extreme case. The clinic I volunteered at was a government funded clinic. Therefore, pregnant women were expected to buy gloves for the doctor, a bottle of iodine, a bottle of saline, a bundle of cotton, a wrap for the baby, and their own bed sheet called a conga.

The day I saw my first delivery, a nurse from Wisconsin and her team were at the hospital. The group from Wisconsin was attempting to educate local nurses on proper delivery techniques in an effort to lower infant mortality rates. The nurse from Wisconsin pointed out that this woman was laying flat on her back for the delivery. She explained that the best position is squatting because this allows gravity to assist with the birth. Before this mother began labor the local nurse tried to empty the patient's bladder with a catheter to prevent friction during the delivery. The nurse from Wisconsin also stated that in the states bladders are not emptied prior to delivery. During this encounter I learned that on average, women lose 500 cc of blood. Through out the delivery, the patient's blood and urine were cleaned up with the cotton bundle she purchased.

I was surprised to see that the Tanzanian nurse delivered the baby while the doctor walked in and out of the room. I questioned this local nurse's qualifications when I observed how she delivered the baby. The Tanzanian nurse held onto the baby's head and pulled from the neck, which frightened me. I was concerned this Tanzanian nurse was going to snap this child's head. The nurse from Wisconsin, in contrast described the proper delivery technique, one should sandwich the baby's head and guide the shoulders. She explained that you should guide the shoulders in order to prevent the shoulders from wiggling and ripping the perineum. Of course the Tanzanian nurse did not guide the shoulders and the baby ripped the perineum. After the delivery, the local nurse stuffed cotton inside the woman to soak up the blood. She surprisingly injected a local anesthetic, lidocaine, while she stitched the perineum. Since this was my first delivery, I was nervous to see that the baby had a bluish tint to his skin but I learned that African American babies usually are blue. I was told that it was necessary to check African American babies' mucus membranes to rule out hypoxia. I was also surprised to see that the newborn was only placed on

his mother's chest for a minute or so and then weighed, bundled, and placed under a heat lamp. I was upset to see the child quickly taken from his mother. I would have liked to see the child lay on his mother's chest for a little longer. The team from Wisconsin was trying to encourage the local nurses to teach new mothers to keep their newborns close to their chest. It is common for local newborns to die due to hypothermia so in an effort to lower infant mortality rates the Wisconsin team wanted mothers to keep their babies on their chests for at least 15 minutes.

While in Tanzania I saw procedures I had never seen before and I completed exams and tests I had never done before. In addition to these amazing experiences I also embarked on several recreational activities. With a group, we walked the base of Mount Kilimanjaro, took a tour of underground tunnels, hiked to waterfalls created from the glacier's on the top of Kilimanjaro, visited a coffee plantation, and went on a four day safari.

While climbing to the base of Kilimanjaro, I learned that it takes about five to six days to climb to the highest peak. There are several different paths to the peak, which are named: Coke, Sprite, Fanta, Whisky, and Risky. The Fanta route is the easiest and Risky is the most challenging. The Tanzanian people did not climb the mountain for recreation but they used to sacrifice animals to their gods at the half waypoint. The local people only started climbing to the top when they discovered tourists were very interested in climbing. Near the base of Kilimanjaro we visited a local coffee plantation. I learned from the local plantation owner that the coffee plants require the shade of the banana leaves. The coffee beans are picked when they are bright red in color. The red skin is peeled off and then ground and sifted onto a banana peel. The owner sifts through the beans again and uses the wind to blow out impurities. He then crushes the beans a second time and roasts them over a fire and then grinds them into a powder that is ready to serve.

The most unforgettable activity through out my trip was the four day Safari through the Serengeti, Ngorogoro Crater and Lake Manyara. The first day we drove through Lake Manyara where we saw monkeys, baboons, wildebeests, cranes, giraffes, and zebras. It was amazing to see the animals in their natural habits. We spent the second and third days touring the Serengeti. We saw giant buffalos, gazelles, wart hogs, hyenas, lions, hippos, ostriches, and jackals. We also saw a leopard relaxing in a tree and watched a cheetah chase and hunt a group of gazelle. The last day we spent in Ngorogoro Crater. At the crater there are 22 white rhinos under twenty-four hour surveillance by park rangers. Recently four rhinos were brought in from a national park from Kenya to help increase the population of rhinos. However, poachers were still able to find the rhinos and they killed three rhinos within a few months. After this unfortunate encounter the park rangers decided to send the remaining rhino back to Kenya. Our tour guide suspected that one of the rangers that is in charge of protecting the rhinos is giving up their locations for a bribe by the poachers. Overall the safari was an amazing experience, I felt like I truly lived part of Disney's 'Lion King'.

Traveling to Tanzania was a unique and life changing experience. I am grateful for the Brody scholarship in allowing me this opportunity. This trip is something I will remember and cherish for the rest of my life. It was a wonderful opportunity to put to use information I learned my first year at Brody. Seeing how

poor health care in Tanzania has made me more passionate to provide health care in rural areas and to underserved communities who truly need health care. Again, I am extremely thankful for the Brody Scholarship for providing me with the means to travel abroad and experience health care in a third world country.

The entrance to Kituj Cah Ya Ngarenaro Clinic.



Working with Nurse Samuel to estimate gestation age.



Nurse Juliana at Ngarenaro Clinic



The Arusha Dispensary's Pharmacy



The health care team at the Arusha Dispensary.



Students from the volunteer house tested children at a local orphanage for HIV.
All the children and care takers tested negative.



