

Prevention of Type II Diabetes in Honduras: El Cacao as a Case Study

Senior Honors Capstone 2016

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Abstract

Honduras is one of the poorest and most densely populated countries in the Western Hemisphere. Poverty affects access to quality healthcare and education, making it hard to manage chronic illness, specifically diabetes. Type II diabetes is on the rise in Honduras; it is estimated that currently up to 10% of adults are affected. This project will focus on reducing the prevalence of type II diabetes in Honduras, highlighting strategies for the prevention of the disease with a strong focus on education. El Cacao, a small village on the northern coast of Honduras, will be used as a case study, where I spent much of last summer as a medical volunteer. I will use much of my exposure to healthcare and the management of diabetes there as evidence to support some proposed strategies for diabetes prevention.

Prevention of Type II Diabetes in Honduras: El Cacao as a Case Study

Background

The Republic of Honduras is a Central American country bordered by Guatemala, Belize, El Salvador, Nicaragua, the Pacific Ocean and the Caribbean Sea. It is home to golden-sand beaches, tropical rainforest teeming with life, towering mountain ranges, and a people group with culture and tradition unique from any other Latin American country. Honduras was first inhabited by indigenous people groups, mainly Mayans, and was colonized by Spain in the 1500's. During the Spanish conquest, Lempira, a chief of the indigenous Lencas, led a resistive movement against the Spanish and maintained a portion of the land, the Miskito region, which never fully fell under Spanish rule. Honduras still honors Lempira today with the Honduran currency, renamed the lempira in 1931 (previously the peso). Hondurans celebrate their day of independence on September 21, when in 1821 they won independence from Spain. This historical past has led to the development of a country with a rich cultural heritage, mixed European and indigenous influence, and a people group unlike any in Latin America.

Poverty in Honduras

Though Honduras is rich in culture, many suffer from poverty. Honduras is the second poorest country in Central America, with a gross domestic product of 20 billion USD in 2014, which is only slightly over \$2000 USD per capita annually, and this is an average; thirty-five percent of the population live on less than 2 dollars a day. The United States, in contrast, had a per capita GDP of \$54,600 USD in 2014 (The World Bank, 2016).

According to Carlos Andréu, Honduras is also the second most populated country in Central America (2008). Though Honduras is more densely populated in the capital city and large cities such as San Pedro Sula and La Ceiba, the population is distributed widely into the southern mountainous regions and along the northern coast, with over 60 percent of the population located in rural areas. Poverty in rural areas is generally more extreme than that of urban areas; half the population in rural areas lacks the basic necessities to support a healthy lifestyle (Andréu, 2012). Because of the isolation of communities, poverty in rural areas is harder to remedy.

Another factor that contributes to poverty in rural areas is the lack of diversity available for employment. The vast majority of rural communities rely on agriculture for their primary means of income. Jansen et al. found that, “Throughout Latin America, rural households that diversify their economic activities into occupations outside the agricultural sector tend to earn higher income than those who rely exclusively on primary agricultural production.” (2008). The lack of opportunity means that most households rely on the income from farming coffee, basic grains, and livestock. Many small farmers are most concerned with producing enough crop for family security, and beyond that profit is limited, making economic growth unlikely.

Healthcare in Honduras

Poverty in Honduras is also linked with poor health. With social indicators such as child malnutrition rate at 17 percent and a life expectancy at birth of 66 years, the effects of poverty in Honduras are marked (Jansen et al., 2008). Quality healthcare is available in Honduras, but at a high cost. Government aid is not attainable for all, and most simply lack

the resources to pay for necessary services. In rural areas, many rely on small, limited clinics for treatments, or have to travel great distances for simple medications and procedures.

As the country's health is an overwhelming challenge that the Honduran government cannot fully address, many mission organizations and charity programs exist that try to meet health needs in the country. But some places, especially rural hillside communities, have no access to healthcare and so rely on local village healers. Public health in Honduras has been a matter of concern for some time. Challenges are recognized by the Honduran government, who have created a long term vision plan called "Visión de País 2010 – 2038 y Plan de Nación 2010- 2022." This plan and the Secretary of Health's National Health Plan, "Plan de Salud 2010-2014" aim to channel government funding into improving health service accessibility for those in poverty, with a large focus on decreasing prevalence of infectious diseases such as malaria and HIV, increasing available services for pregnant women and victims of sexual assault, and increasing vaccine availability (WHO, 2013.)

While they are included in the newest government health plans, in general, chronic, noncommunicable diseases have not received high priority in health policies. While it seems like this country may face bigger, more pressing challenges, chronic diseases still have considerable effect on the nation's health and should be dealt with accordingly. A 2009 study by the Pan American Health Organization showed that 22.6% of the adult population of Tegucigalpa had hypertension; 6.2% had diabetes; 53% had high total cholesterol or cholesterol at the upper limit of normal, and 51.7% were overweight or obese. Chronic illnesses are especially hard to manage in poverty-stricken areas with limited resources and often no access to supervision by health professionals.

Type II Diabetes in Honduras

Diabetes mellitus is one such disease that is increasing in prevalence in Honduras. Recent studies suggest that up to 10 percent of the population may suffer from diabetes mellitus, or 820 million Hondurans (Magalhães, 2011). Shocking statistics have brought diabetes to increasing worldwide attention, leading the United Nations to sign an initiative in 2011 to prioritize the attention of diabetes. Eighty percent of deaths from diabetes happen in low-income countries. According to data published by WHO in 2014, Diabetes Mellitus deaths in Honduras accounted for 2.29% of total deaths.

Diabetes mellitus is a disease of several forms that results in excess sugar in the bloodstream, due to a lack of insulin or lack of the ability to use insulin to regulate blood glucose. Type I diabetes happens when a body's immune system attacks beta cells of the pancreas, which create insulin. There is considerable genetic basis for Type I diabetes and lifestyle has less of an effect on the onset of the disease than in Type II diabetes, which is the most common form. With Type II diabetes, your body develops resistance to insulin and does not use it properly to manage blood glucose levels. Hyperglycemia (high blood sugar) develops, and, if untreated, effects on the body range from nerve problems and kidney disorders, to blindness and severe infections (Mayo Clinic, 2016). Risk factors for this type of diabetes are poor diet, low physical activity, and obesity. A high sugar diet requires increased insulin to process glucose, and this can lead to resistance to insulin. Since primary symptoms are often subtle, usually starting with excessive thirst and frequent urination, diabetes can be dangerous in that it often progresses aggressively before becoming apparent.

In equatorial climates like Honduras, symptoms like excessive thirst can seem normal on a particularly hot day.

In areas where poverty is widespread, people often turn to high-calorie, high-sugar foods, and with prices for health food on the rise people continue to turn to increasingly unhealthy options. Close to 20 percent of the population of Honduras is considered obese, according to 2011 WHO statistics, and that number is considerably higher in urban areas where processed, high caloric food is easily accessible. Obese adults have a 3-7 times greater risk of Type II diabetes than adults of normal weight, especially when they have a large percentage of abdominal fat (Magalhães, 2011). Obesity plays a large role in the body's developed resistance to insulin. Type II diabetes also has a genetic factor, which puts Latinos at a higher risk than others, increasing the relevant concern in Honduras. One study found that when looking at all Hispanic/Latino groups, total cases of diabetes, both diagnosed and undiagnosed was 16.9 percent for both men and women, compared to 10.2 percent for non-Hispanic whites (ADA, 2014.)

Type II diabetes is usually diagnosed later in life, often after the age of 30 (Magalhães, 2011.) The disease has no known cure, but can be treated if one is willing to learn and commit to management of the disease, which usually includes a change in lifestyle. Though awareness of the disease is growing, it is still overlooked, under-diagnosed, and in many cases only brought to light after patients experience severe symptoms. One study including several Central American countries found that Honduras had the highest percentage of undiagnosed cases of diabetes, at 53 percent (Barcelo et al., 2012). An effective screening system would be a possible beneficial mode of prevention in Honduran

clinics, along with education and public health announcements. Without action, diabetes is predicted to rise in Latin America drastically in the years to come, bringing severe negative impacts on health. Preventative strategies must be administered.

Preventative Measures: Screening for Diabetes

Ideally, health screens and proper management of the disease could prevent almost all the complications due to diabetes. Major complications include cardiovascular disease, diabetic neuropathy, stroke, retinopathy leading to blindness, raised blood lipids, and hyperosmolar hyperglycemic nonketotic syndrome, a severe condition which can lead to altered consciousness, and even death (Magalhães, 2011). The American Diabetes Association recommends several screening measures. Besides blood sugar monitoring, blood pressure should be controlled (at or below 130/80 mmHg), lipids and triglycerides should be monitored, and foot care screenings should be regularly conducted, as well as periodic eye exams (ADA, 2008).

While some urban clinics in Honduras are well equipped, care is expensive, and many more rural areas have only small clinics with limited supplies. For a screening to be effective in rural clinics, it would have to be simple and inexpensive. There are a few options. An oral glucose test is one option, but it is difficult to administer, requiring hours of preparation and blood sampling, and the patient must drink an unpleasantly sweet liquid (WebMD, 2014). More advanced laboratory tests, such as the A1C test that examines a patient's blood glucose over the last 3 months, are not feasible in a limited rural clinic. A streamlined screening method for rural Honduran clinics could develop a general knowledge of diabetes prevalence using indicators such as BMI, patient history, and blood glucose readings. All these factors

are easily measurable, and could be completed in 10-15 minutes. In a recent validation study, a screening using these elements was implemented in rural Honduras and found to be a valid measure of overall diabetes risk in the area, with a sensitivity of 74.1% and specificity of 97.2% (Milton et al., 2010). In the screening, random blood glucose sampling is combined with BMI measurement, blood pressure reading, and postprandial time (time after eating) is recorded. A short questionnaire is given, including family history, lifestyle, age, gender, and birth history (Herman et al., 1995). This screening process is a simple, inexpensive, and effective way to prevent complications of Type II diabetes in Honduras. If screenings were government-funded it would increase patient involvement; free screenings could be advertised and encouraged in the community.

Combined with medication, screenings can lower risk of diabetes progression. The drug metformin is common in treatment of Type II diabetes, increasing insulin sensitivity and decreasing blood glucose. The drug is fairly cheap, usually less than 3 cents a tablet, and is already widely available even in rural clinics in Honduras. Screenings are a useful and feasible way to lower risk of diabetes in Honduras, especially in rural areas. But after raised awareness, action must follow. To decrease diabetes rates in Honduras, lifestyle changes must be made.

Preventative Measures: Lifestyle Changes

While screening and management of diabetes would greatly increase the treatment and control of the disease, they wouldn't prevent the onset of diabetes as well an early awareness and lifestyle change would decrease the risk of diabetes in an individual. Group intervention has been shown to alter behavior on many occasions, as demonstrated in diabetic

control in *the Malmö study*, a 6-year feasibility study conducted on Swedish diabetic males. In the study, healthy lifestyle changes were shown to increase self-efficacy and improve condition of diabetes in the subjects, including improved glucose tolerance and lower body weights (Magalhães, 2011).

Lifestyles vary throughout the regions of Honduras. Those with the greatest risk for diabetes live in urban areas. Looking at populations in the hillside regions, people generally live a more active lifestyle, and rely on farming and livestock for food instead of the easily available fatty and sugary foods found in urban areas. The higher altitudes also create a cooler, more arid climate, which can boost activity levels.

Since urban areas are at a greater risk for obesity, and thus diabetes, public health campaigns are a good option for raised diabetes awareness. Where human population is denser, information travels faster and influence spreads. There is a great opportunity for social marketing in urban areas like Tegucigalpa, San Pedro Sula, and La Ceiba. Urban areas are comprised of a large percentage of young people; currently 55 percent of Hondurans are under the age of 24 (Indexmundi, 2015). This creates a great potential sphere of influence, and most urban areas currently don't take advantage of the potential for public health advertisements. Effective marketing strategies to push the population toward healthy life choices would focus on nutrition and physical activity. There are healthy options available in Honduras, and inexpensive ones, too. The country grows papayas, mangos, bananas, and other tropical fruits as well as avocados, corn, peppers, yucca, and tomatoes. Chicken and fish are in abundance, as well as beans and rice. Healthy options are available; it is a matter of education and personal motivation that lead to healthier choices.

To be effective, campaigns would market to the younger generation. Many young Hondurans are fascinated with soccer, and sports stars are great models for health campaigns. Partnering with the Honduran football team, Los Catrachos, in a simple health promotion advertisement encouraging physical activity and nutrition would have tremendous influence on the young urban population. The goal would be to encourage young people to take personal accountability for their own health, and to avoid the risk of Type II diabetes from a young age. But to know what the risks are, education is required.

Preventative Measures: Health Education

Education is a crucial and invaluable part of community health, and is the single most important factor in preventing diabetes in all areas of Honduras. Without knowledge, one cannot make informed decisions. Currently, education is free and required for students age 7 to 14 in Honduras. Though the public education system is, in theory, designed to reach urban and rural areas equally with quality education, there is a deficit of schools, funding, teachers, and equipment, which affects rural students to a greater degree. Urban schools have an average ratio of 34 students per teacher, where some rural schools in Honduras have as many as 80 students per teacher. In contrast, more developed countries like Costa Rica have as few as 22 students per teacher (Andréu, 2012). The literacy rate in Honduras is less than 3 quarters of the population (Jansen et al., 2008)

Education has long been known to be a key predictor of health outcomes, and advancements are being made in Honduras to include more about health in classroom curriculums and to expand health education to rural areas. Last year, the World Bank approved \$25 million to go to support Honduras' Bono Vida Mejor Program, which aims to

increase accessibility of preventative health and education services to over 300,000 families living in extreme poverty (The World Bank, 2015). The Bona Vida program, and other efforts such as health fairs and clinics put on by charity organizations have made considerable advances in public health in Honduras. However, there is still a lack of health education, especially in rural schools. This was apparent to me when I visited a rural school in El Cacao, Honduras. The children there showed amazing potential, and I could see how just some basic additions of health education to their schooling could make a big difference in introducing real changes that could lower diabetes rates.

El Cacao as a Case Scenario

Though diabetes is more prevalent in urban areas of Honduras, as a chronic illness it is much harder to manage in rural areas where access to healthcare is limited. El Cacao, Honduras is a small village located on the north coast, about 30 miles east of the city of La Ceiba. Cacao is characteristically rural, though it's proximity to La Ceiba produces an urban influence and diabetes is a major problem in the village. Last summer I spent 8 weeks volunteering in a mission clinic called la Clinica de Proyecto Esperanza, or Project Hope Clinic in El Cacao, and I became quite familiar with the community, the healthcare needs, and the educational needs of the village. The people of Cacao are beautiful, warm, patient, and caring. They face daily challenges in an area where poverty is widespread and agriculture is the primary source of income. Though they have little, they are strong and hearty people who have an intense sense of loyalty and family in their village.

As I volunteered in the clinic, I saw many cases of diabetes, which was what first interested me in the topic for further study. Many new cases were diagnosed while I was

there, and there were only a few patients who seemed to be managing the illness well. Cases of extremely high blood sugar were a common occurrence, and I often saw infections in the feet and elsewhere due to poor management of the disease. Patients were many times surprised that they had what is called *azucar en el sangre*, (sugar in the blood), and were usually surprised that this could be the cause of their symptoms. Though our clinic was limited, we were stocked with metformin in the pharmacy, insulin, and blood glucose meters, making us prepared to treat most cases of Type II diabetes. What most patients lacked was education about diabetes, and thus the ability to personally regulate their blood sugar and make informed healthy lifestyle decisions.

Spending time in the schools further demonstrated the lack of health knowledge in the village; little to no health education was taught in the classes. During my time there, we conducted a health fair in Cacao and a few other villages nearby, and often the students were hearing the information on nutrition, sexual health, and hygiene for the first time. I was surprised when students told me that they thought meat gave them cavities, and when one girl sat in a stream for 2 hours the first time she menstruated, thinking she was bleeding to death. The need for health education was apparent.

The students in Cacao taught me the importance of education. The teaching I had taken for granted in my own life was clearly lacking in this school, and I so desperately wanted more for them. Since most of their parents didn't finish 6th grade, few students graduate high school, and this has become the norm in many rural villages. Often students drop out even before 6th grade to help with family income; almost none go on to college. But the potential is there; many students are so eager to learn, so bright and hungry for knowledge, and with the funding and opportunity they would thrive in high school and

college. Some do go on to university, often sponsored by a donor, and these kids seemed to me to be the leaders in their social setting. Education is such an important tool for empowering young minds and giving them a bright future. That is why I came up with a sample introductory health presentation on diabetes, in Spanish, to raise awareness of the disease in Cacao. The course is geared towards elementary students, and it starts with an introductory to health, including nutrition and personal responsibility, and focuses on diabetes, what it is and how it can be prevented. Though it is a small part, I believe that if we care, if we truly do what we can, together our small parts can create a big change in the health of a country. Honduras is a beautiful place, full of diverse individuals, and, though they face many challenges, with the right tools they are fully capable of living a full, productive, and healthy life.

Conclusion

In summary, Honduras faces many health challenges. One of those is the management of chronic illness in areas of poverty. Diabetes mellitus is a specifically high-risk disease based on the country's health demographics, and there are various preventative measures that can be implemented. A screening test would be effective in raising diabetes awareness and preventing complications. Lifestyle change would do the same, and prevent the onset of diabetes. Social marketing is an effective tool of influence that could encourage the Honduran population to make healthy lifestyle changes. Overall, education is the most important factor in preventing diabetes in Honduras. The current education system teaches little about health, and even a simple healthcare class would greatly increase the ability of young people to make informed decisions about their own health, specifically in the prevention of obesity and diabetes. Type II diabetes is a real concern in areas of poverty,

where chronic illness is difficult to manage. But with these strategies, keeping a strong focus on education, the risk of diabetes can be lowered and Hondurans will be able to live longer, healthier, and more fulfilling lives.

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