

**Assessing the Emerging Diabetes Epidemic and Barriers to Care  
Among Indigenous Latin Americans**

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## **Abstract**

Indigenous populations have been exploited and neglected for decades since the colonization of Latin American nations. Conflict persists in many Latin American countries, resulting in the isolation of indigenous peoples from advances in medical facilities, health screenings, and health education. Indigenous populations are having to make cultural and lifestyle changes to align with urban and modern advancements, but not without major challenges and sacrifices. It is estimated that the prevalence of diabetes will double globally from 2000 to 2030 and will disproportionately affect developing nations worldwide.<sup>2</sup> Even with the many advances in diabetes treatments, indigenous peoples have little access to medications due to location, cost, and cultural differences. There have been some programs that have been effectively implemented to increase quality of care and education, but much more needs to be done to reach all those that are at risk. With the data and research available within these populations, I will address the high mortality rates of indigenous individuals, particularly due to diabetes, and the disparities they face when receiving health care.

## **History of Indigenous Health**

Describing the attributes of indigenous populations would not be instructive without first attempting to define the complex notion of indigeneity. According to the WHO, indigenous populations are communities that live within a traditional habitat or ancestral territory and identify themselves as part of a distinct cultural group or descending from a distinct cultural group present in the area before modern states and borders were defined.<sup>19</sup> The UN describes indigenous peoples as “inheritors and practitioners of unique cultures and ways of relating to people and the environment.”<sup>17</sup> Finally, Jose R. Martinez Cobo provides the most cited concept of indigenous peoples in his *Study on the Problem of Discrimination against Indigenous*

*Populations*, stating that indigenous persons are those which have a historical continuity with pre-colonial societies, live in an indigenous way and is accepted by these populations as one of its members.<sup>13</sup> While there is no official definition, I will consider indigenous populations in this paper as communities and nations whose roots antecede colonialism, and who maintain the identity and many of the traditions of their ancestors. Additionally, this paper focuses specifically on these populations in Latin America, which includes all of South America in addition to Central America, Mexico, and the Caribbean islands.

There are over 400 different Indigenous groups, each with their own distinct language, living in Latin America. It is estimated that these groups make up 10% of the total population in the region.<sup>15</sup> There is a long history of violence, inequity, and oppression of the indigenous people in Latin America. The region was colonized by Spain and Portugal starting in the 15<sup>th</sup> century, fought for independence in the 19<sup>th</sup> century, and withstood many individual civil wars in the 20<sup>th</sup> century. Much of this violence targeted indigenous peoples, decreasing their population size and instilling racism toward and oppression of the populations for decades. Many tribes were forced out of their lands and were pressured to conform to mainstream ideologies. In Guatemala, traditional healers were specifically targeted during the wars due to the fact that they were leaders in their communities.<sup>9</sup> Understandably, the conflicts lead to mistrust towards the governments and biomedical professionals.

The mix of indigenous and modern territories creates a complicated intercultural web of people, lifestyles, health systems, and languages. In many places around Latin America, urban areas have developed close to indigenous lands, creating a stark polarity in the availability and allocation of resources and opportunities. Indigenous languages are an integral part of self and group identity and are fundamental in indigenous health and health systems.<sup>15</sup> Communication and linguistic barriers between mainstream health care providers and indigenous patients hinders

quality health care. In addition, an aspect of cultural misunderstanding or neglect can be another barrier for the community. Finally, physical access to medicine presents a significant challenge to these populations because hospitals and other health care facilities are based in urban areas while most indigenous communities reside in rural locations. These factors create systems where the indigenous peoples lack adequate access to the culturally appropriate care they need, as well as education and preventative programs.

It is theorized by Montenegro that indigenous health cannot be viewed as an issue of health systems alone, and people cannot be viewed independently of their ecosystem and sociopolitical context.<sup>15</sup> This theory brings up the question if it is ethically appropriate, or effective, to create intercultural health care systems, or if we should simply allow at-risk populations to live in voluntary isolation from the mainstream world and medicine. I will not expand further on the ethical debates surrounding this subject in this discussion as they raise a multitude of concerns, but it would be unwise to discuss the mortality and health disparities that indigenous populations face without first appreciating the depth of mistrust and misunderstanding they have experienced for generations.

### **Lifestyle Changes and the Impact on Health**

The lifestyles of indigenous populations are evolving so rapidly that it can be difficult to keep up with the immediate needs of the people. Westernization and Globalization ideologies are spreading quickly worldwide, and the trend has not spared even the most remote areas of the Amazon and the Andes. Many of these communities are moving away from the hunter and gatherer vocations to other lines of work which can have implications that the individuals may not be aware of.<sup>18</sup> As the hunter and gatherer lifestyle has become obsolete, communities are forced to shop at local markets, with the least expensive items being white bread, noodles, rice,

potatoes, squash and onions.<sup>18</sup> Often times, those who have some extra money to spend at the markets will purchase soft drinks or processed snacks, which are fairly new to many rural areas in Latin America. This diet is a significant change from fresh fish, meat, and vegetables that was either hunted or grown on indigenous territories. Although there is still a thriving agricultural industry in many Latin American nations, much of the fresh fruits and vegetables are exported to the United States and Europe. There are many reasons for this which include preference, tradition, and profit. When interviewing the Toba tribe in Argentina, one study found that the members consider the major difference between the “life in the past” and life today as their diet composition.<sup>18</sup> A more sedentary lifestyle is also an important change in these populations as they are not working in the fields or walking to gather supplies as much as before, contributing to high obesity rates. It is important to note that these lifestyle factors are not only an individual problem, but a community obstacle. This parallels the theory that the health of an individual cannot be evaluated independently of their ecosystem. Changes in a community’s built environment can be gradual, making it difficult for the community members to note behavioral and lifestyle changes and modify their actions accordingly. Another challenge is the perception of health and appearances in some of these regions. Many women associate being overweight with being healthy, and it is assumed in many cultures that this also means you are well off financially because you are “well nourished”. Since all meals are an important time for social and familial gatherings in Latin American culture, dieting or changing the quantity of food intake is not as common or easily implemented as it is in other cultures.

The rise in chronic diseases is also partly due to advanced aging and increased life expectancy in these populations. With modern technology and education reaching indigenous populations, life expectancies are increasing, and infant mortality is decreasing. With those great worldwide accomplishments, the prevalence and mortality rates of chronic diseases have

increased, making quality primary care and preventative medicine a major healthcare necessity for any community in a developing country. In a study with rural indigenous populations in Guatemala, type 2 diabetes was found to be correlated with age, but not BMI, speculating that lifestyle changes are not fully to blame for the increasing prevalence.<sup>2</sup> This is particularly problematic because although behavior change is a daunting task, there are nutrition and exercise interventions that can be implemented whereas “lean diabetes” is more difficult to curb. Lean diabetes is when type 2 diabetes is found in patients with a low BMI and can be correlated with childhood malnutrition and a low socioeconomic status. It is reasonable that it is found in indigenous populations where there is a lack of quality preventative healthcare and proper nutrition among both adults and children. Curbing the rise of lean diabetes, therefore, requires preventative public health starting from birth and the development of economic growth within this population. This also highlights the need for better drug coverage and access, since individuals are living longer, meaning they could be living decades with a disease that can be treated and managed with medication.

### **Diabetes and Comorbidities Within Indigenous Populations**

Non-communicable diseases and the mortality associated with them are the most threatening long-term health epidemic in low- and middle-income countries. These diseases are also the top causes of death in many developed countries as well, particularly within their low-income populations. This trend is, as discussed above, multifactorial and complex. The top morbidity causes among women in Latin America include high blood pressure, high cholesterol, diabetes, and gall bladder disorders, which are all correlated with obesity.<sup>18</sup> Over half the Toba women in Argentina are overweight.<sup>18</sup> Forty-eight percent of the population in Mexico City, and 37% in rural Mexico, was considered overweight in 2003.<sup>12</sup>

There are multiple types of diabetes, but the type we are presently discussing is type 2 diabetes. Type 2 diabetes usually develops in adulthood and is the most common form. It is associated with diet and lifestyle and is defined by insulin resistance. Indigenous populations worldwide are experiencing a rapid increase in type 2 diabetes compared to their non-indigenous counterparts in the same areas, with over 50% of indigenous adults living with the disease.<sup>2, 8</sup> Bream et al. found that over 25% of the indigenous population in Guatemala live with either type 2 diabetes or pre-diabetes.<sup>2</sup>

Gestational diabetes has also become an increasing health problem in indigenous women and their children. Gestational diabetes is a key predictor of the diabetes epidemic among indigenous populations and also contributes to the rise in prevalence and incidence of the disease.<sup>8</sup> Among the Pima Indians in the United States, maternal glycemia during pregnancy was associated with increased birth rate and a risk of diabetes in their offspring.<sup>8</sup> As children are developing diabetes and its comorbidities earlier in life, more strain is put on health care systems and families because these individuals are living even longer with the disease.

Along with the rising prevalence of diabetes comes the dangerous effects of its comorbidities and complications. There is a strong association between obesity and hypertension, with 40% of individuals presenting with both diseases.<sup>12</sup> Obesity, smoking, hypertension, stress, and lack of exercise are risk factors for heart disease in Latin America, and a history of diabetes is strongly associated with acute myocardial infarctions.<sup>11</sup> Consequently, cardiovascular deaths were attributable for 26% of all deaths in Latin America in 1990, which has likely increased since then.<sup>11</sup> Heart disease can also require long term monitoring and medical treatment, which adds to the strain put on the individual. Additionally, this adds to the likelihood of preventable death due to lack of access to a hospital or medications when complications arise. As discussed above, Latin American children are also developing obesity

and are at a higher risk for hypertension when older due to their parent's persistent obesity and hypertension.<sup>12</sup> This creates a reinforcing loop that intensifies the epidemic of chronic diseases in Latin America. In recent years, diabetes has been linked to a higher risk of developing certain cancers. This could be explained by multiple causes, including other comorbidities, but may be associated with the dependence of cancer cells on glycolysis for energy.<sup>7</sup> Insulin receptors are also expressed by breast cancer cells in particular, increasing incidence in this population.<sup>7</sup> Additionally, cancer mortality is higher in Latin America than more developed nations, even though the incidence of many cancers are lower. Specialists in heart disease, cancer, and other comorbidities are also mostly located in urban areas, providing barriers to access to care and prevention for indigenous populations.<sup>10</sup> The correlation of cancer and diabetes could benefit from more research, particularly in the indigenous population, to create evidence-based screening programs.

### **Access to Care for Diabetes**

Type 2 diabetes has been researched for decades and can be managed easily with medication access and quality health and nutrition education. Despite modern developments for treatment, medications like insulin and metformin are cost prohibitive to many. Indigenous populations have much less access to these medications because of their lack of medication coverage, access to clinics, and social stigma. Some Latin American governments, especially in Central America, are still corrupt and provide very little funding for health care. This combined with the institutionalized racism of the health care systems provide extreme barriers to indigenous individuals who need care.

An alternate to biomedicine is the primitive art of traditional medicine. Traditional healers play an important role in the indigenous communities and often act as respected leaders



of the groups. Other forms of traditional medicine are treatments that are passed down through generations and are usually plant-derived. Governments rarely provide funding for traditional medicine, and some do not recognize it as health care. In Guatemala, Mayan medicine was recognized in the constitution after the 1996 peace treaties but has had little to no actual impact on the health care systems.<sup>9</sup> Many indigenous peoples choose a combination of both traditional and biomedical health care, and some clinics are attempting to offer intercultural partnerships with traditional healers and biomedical doctors. This is especially so in areas where, due to the changes in indigenous lifestyles, communities are moving from rural territories to urban areas with more access to food, healthcare, and opportunities. Intercultural health care is ideally where mainstream medicine and traditional medicine are used in a complementary manner in treating patients.<sup>14</sup>

In addition to the comorbidities discussed previously, untreated diabetes can result in life-altering complications including lower limb amputation, neuropathy, retinopathy, nephropathy, and ultimately death.<sup>8</sup> Without managing the disease appropriately, whether it is due to lack of access to medication or lack of education, people are losing jobs, social status, and quality of life from these complications. For indigenous populations who are already marginalized, losing a limb or living with blindness can broaden the gap between them and their non-indigenous counterparts. This again adds to the reinforcing loop where generations are disadvantaged and therefore have a greater likelihood to develop chronic diseases.

Although we have been discussing indigenous populations living in Latin America, many indigenous people travel or emigrate to other countries for work, especially as their professions are becoming obsolete. It is often the case that immigrants in the United States are in better health than native born U.S. citizens, but after a few years their health starts to deteriorate.<sup>3</sup> These immigrants are also often less likely to trust the governments of many Western nations

due to the history of conflict in their own lands. Immigrants are also starting to stay away from assistance programs in the United States due to fears about the effects on their legal status.<sup>3</sup> There are additional language barriers in the United States as there is little familiarity with indigenous languages and sometimes a lack of Spanish speaking physicians. This generates a power dynamic shift in families as children are often turned into health care interpreters.<sup>3</sup> There is no doubt that indigenous immigrants have as much or more difficulty receiving quality health care in the United States as they do in their native nations, regardless of the amount of opportunities are seemingly provided.

### **What is Being Done?**

There have been many great initiatives for increasing the quality of healthcare in indigenous populations worldwide. Activism for the indigenous people has increased in many nations. Globalization has increased the knowledge of the discrimination towards indigenous people, particularly as they move to urban areas and mix their traditional lifestyles with more modern ones. The increase in technology dissemination has also provided indigenous people with education about their governments and has promoted activism for their traditions and rights. There are also organizations, nonprofits, and clinics that have been established in recent years that choose to serve indigenous populations in their own language and cultural preferences.

Biomedical researchers are studying traditional treatments in hopes to understand their use and also provide some validity for a more social acceptance of traditional healing. A study on a Q'eqchi' Maya tribe in Belize found many plants that are physically beneficial to diabetics.<sup>4</sup> They found 70 traditional plants and herbs that were used for clinically diagnosed diabetics to treat diabetic sores, chest pain, increased thirst, and increased urination. They also found that these herbs were widely accepted by patients and are enjoyable to use and drink.<sup>4</sup> Often times

these are taken as supplements to modern medications when available, establishing an interconnected treatment plan that encourages mutual respect of the cultures. Traditional medicine also highlights the connectedness indigenous peoples have with the environment. Many of the beliefs of indigenous peoples are based on the land, water, and sky. Traditional medicine not only can provide evidence based physical benefits, but can align the patients back to their beliefs which is important for their mental and spiritual health.

A clinic in rural Guatemala implemented a quality improvement project for type 2 diabetes in a resource-limited setting.<sup>5</sup> They focus on the needs of the patient, including providing care in their primary Mayan language and providing home visits to check in on their patients. The clinic's integrated diabetes interventions were statistically shown to be effective in improving care and glycemic control of diabetic patients. Through their home visits and personalized care, the clinic had more patients meeting their target HbA1C as well as more patients following up with clinic visits after initiating the interventions. They also showed that quality improvement projects are possible and successful in resource-limited settings which opens up a door to countless research opportunities. They encourage other clinics who treat diabetics, especially in low resource settings, to implement some of their quality improvement strategies because they were so successful.<sup>5</sup>

In Argentina, a program by the Ministry of Health is training indigenous health workers with the aim to improve coverage and access to care for indigenous communities. Nine hundred indigenous health care workers have been trained and deployed back to their communities since 2005.<sup>10</sup> Mignone et al. found that health care systems are most effective when indigenous entities are involved in the organization of the programs.<sup>14</sup> This is a great way of establishing trust within the community and creating a sustainable program. Not only does this give back to the health of the people, it also provides job opportunities and a way to halt the cycle of poverty among

indigenous families. Encouraging this social support and integration of ministries of health and indigenous workers can promote more intercultural collaborations and will be beneficial for all communities.

### **What More Needs to be Done?**

The rapid increase of diabetes morbidity and its related inequities should not be taken lightly by Latin American governments, global health organizations, local clinics, or the individuals living with the disease. Recent studies emphasize that the prevalence of diabetes will increase rapidly in developing nations if nothing is done to halt the disease.<sup>2</sup> Despite the many great organizations and initiatives in effect right now in Latin America, there are still barriers that need to be broken down to bring significant change in the health of indigenous peoples.

Health literacy needs to be addressed in indigenous Latin American populations that are living longer, many with chronic diseases.<sup>1</sup> Health education and literacy is essential for the management of chronic diseases among all populations. Literacy of the natural history of diseases in particular is lacking, along with the role of prevention in regard to modifiable risk factors.<sup>5</sup> The majority of chronic diseases require lifelong treatment, which is a difficult concept to comprehend if your beliefs are deeply embedded in the idea that the health of the body is intertwined with the spirit. In a qualitative study of an indigenous community in Yucatán, Mexico, much of the community members living with diabetes equates it with a single stressful and life changing event, such as a death in the family or a sudden illness, reporting that the symptoms began days or even hours after that landmark event.<sup>6</sup> They also reported that when doctors told them to change their diet and exercise habits, they were never given specific guidelines or recommendations, and there was little follow up to check on their progress. The doctors in that clinic, however, hypothesized that the patients did not follow up with the clinic

because of their “lack of education and ability to recognize the symptoms of the condition.”<sup>6</sup>

Health care providers should learn the cultural beliefs of their patients, especially if it will affect the treatment plan, and find guidelines that work with their lifestyle. The communication and trust barriers between providers and indigenous patients need to be addressed if we are to continue intercultural health care in these regions.

Intercultural health care has been shown to be an effective way to combine the beneficial qualities of both traditional and modern medicine.<sup>14</sup> These programs have multiple barriers including the linguistic diversity of the indigenous communities and a communication breakdown from cultural expectations and educational differences. When some programs were piloted, however, researchers found that the biomedical providers were often “training” the traditional healers instead of the “two-way exchange” of information that is desired.<sup>14</sup> This could be an unintentional effect of intercultural medicine, but it could also be due to discrimination. A more streamlined and interactive program between traditional healers and medical doctors would be more effective way of gaining the trust and support of indigenous populations. More funding for these initiatives would also be beneficial for the improvement of healthcare in these regions. Validation of a program of this sort would build trust in the providers that this system of a two-way exchange is beneficial and effective. Thus, more research is necessary to encourage buy-in for this approach.

Since gestational diabetes poses a significant threat to the diabetic status of offspring, screening in early pregnancy and effective interventions are essential to decreasing the next generations from developing diabetes. This also requires the trust of the indigenous population and can be implemented by traditional healers with some training. By decreasing the number of individuals in a family with chronic diseases, more money can be spent on education, preventative health, and increasing the economic gain of the family.

Increased social support for indigenous peoples would make education and health literacy worthwhile. Many women say they cannot change their diets because it would be unacceptable to eat differently from their husbands and children.<sup>6</sup> They fall back on traditional herbal remedies which can be beneficial, but the effects can be overshadowed if they don't change their diets. Frank et al. suggests that a more integrative and less biomedical approach would earn the trust of the indigenous populations, finding a way to combine culturally appropriate methods that will be accepted in the community.<sup>6</sup> Including men in the health education process would be a way to create a healthier family structure and decrease the "machismo" culture. Machismo is a sociocultural term that involves masculine pride and the set of values and attitudes regarding masculinity. Machismo oftentimes can disrupt interventions in this population because men ultimately have the final say regarding changes in the household which includes health and lifestyle choices.

Evidence-based diagnosis and treatment strategies should be a priority for all communities that involve indigenous individuals and families. Data on diabetes are usually accrued in urban areas, which are likely gross underestimates of the prevalence of the disease in each region due to large rural populations in many Latin American countries. Bream et al. did not find an association between BMI and type 2 diabetes and they hypothesize that this is due to the lack of data on indigenous Latin American physiology. Indigenous populations are under-researched worldwide and this could create limitations on further studies until there are guidelines specific for this population.<sup>2</sup> Diabetes guidelines including plasma glucose levels, glycated hemoglobin, BMI, and associated symptoms have not been developed based on indigenous physiology and genetics, therefore we may not know the entire spectrum of how the disease presents and how it is best treated. Many studies have discussed if Hispanic populations have a genetic predisposition to diabetes and its associated comorbidities but no definitive

explanation has been suggested in the literature.<sup>2,8,16</sup> A whole-exome sequencing study on indigenous Mayans in Mexico found three new genetic variants that contribute to the susceptibility to developing type 2 diabetes, highlighting the need for more of these studies on a wider population to fully understand which individuals or populations may be at risk.<sup>16</sup> More data are needed on the indigenous populations to ensure quality diagnoses and treatment regimens.

### **SMART Goals**

The barriers to changing the trajectory of diabetes and its complications seem intractable, but change is possible. Starting with baby steps is imperative when managing noncommunicable diseases, as behavior and policy change can be slow moving. Therefore, I propose the following goals that aim to reverse the trajectory of diabetes in indigenous Latin American populations with the long-term goal of reducing prevalence of diabetes in this population in the future. By the year 2030, the incidence of new diabetes diagnoses and associated complications within indigenous Latin Americans should reduce by 50%. Morbidity and mortality due to diabetes should be calculated and analyzed annually, measuring improvement and aiming to decrease new incidence of diabetes 5% each year which will accumulate to 50% by 2030. These rates should be measured in each Latin American nation that has indigenous populations and aggregated annually to check progress.

There have been many successful programs from different angles that show improvement in access to care and decreasing barriers to quality healthcare. A few of these programs have been highlighted in this paper. These programs can be implemented even in very rural locations and will increase health literacy and the overall health of indigenous populations. However, in many of these areas, surveillance systems may not exist, which would pose a significant

challenge for monitoring progress. Establishing screening, surveillance, and increasing provider and consumer education in these countries would be instrumental in reaching our ultimate goal. In order to do this though, we would need to pull down barriers that have prevented these systems from working in the past. Before attempting change in incidence of diabetes, it is imperative that we address institutionalized racism and machismo, increase economic opportunities and social support for indigenous peoples, and conduct more research on evidence-based strategies that could benefit this population. By 2030, the estimated prevalence of diabetes in Latin America will be 33 million, even if the levels of obesity remain stable.<sup>2</sup> Therefore, we will use the year 2030 as our goal to decrease the incidence rates by 50% and reverse the trajectory of diabetes among indigenous peoples in Latin America.

## **Conclusion**

Decades after the colonialization and subsequent violence in Latin American nations, the effects of discrimination and globalization have disproportionately affected indigenous populations to the emergence of the diabetes epidemic.<sup>8</sup> Government policies have overtly omitted the culture and needs of indigenous peoples which has led to the marginalization and mistreatment of this population. Many great organizations have found innovative ways to improve the quality and access to health care within these populations, especially with diabetes treatment. Some intercultural healthcare programs have been found to be effective, if they have indigenous individuals heavily involved. Quality improvement methods have been implemented successfully even in low resource settings. Much more work needs to be done regionally to decrease the prevalence and incidence of diabetes and its complications. Quality and innovative screening practices should be implemented to diagnose those at risk for diabetes and gestational diabetes. Healthcare should be cross cultural, and patients should be able to receive care in their



native languages. In this ever-changing world with an increase in knowledge dissemination and technology advancements, we should have hope that our efforts can be effective in decreasing the morbidity and mortality of diabetes within the indigenous populations in Latin America.

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