This is a paper written by a Latin American Studies undergraduate student for the seminar class LAST495W: Native Latin Americas and Indigenismo. Their research of contemporary issues in indigenous Latin America was conducted under the direction of their faculty mentor Professor Stephen Lewis. This paper used the American Psychological Association (APA) Style, which is typical for papers in this discipline and utilizes in-text citations.

Obesity in Mayan Communities and the Increased Consumption of Processed Foods

Juliana Palmas Vera

Introduction

Standing as one of the leading countries affected by both high levels of obesity and diabetes is Mexico (Barquera and Rivera, 2020). Since 2016, Mexico has declared a public health crisis, with more than 72 percent of its adult population diagnosed as overweight, obese, or diabetic (Barquera & White, 2018). Since 2010, the Mexican government has implemented multiple policies and programs in an effort to combat the consumption of industrialized and processed foods but obesity is still a problem. Barquera and Rivera (2020) attribute these persistently high rates to pressure from multinational food companies whose presence is strong in the Mexican economy.

Obesity has managed to infiltrate even the most rural areas including indigenous communities through globalization (Pérez-Izquierdo et al., 2020). Among the most affected indigenous communities are the rural Mayan communities in the Yucatán Peninsula, Mexico. For decades, indigenous communities have undergone a major transition to a tourism-based economy that has caused significant changes in their diet which then impacts individual body mass index (BMI) (Leatherman et al., 2010). Mayan communities along the Yucatán Peninsula have been exposed to globalization and the tourism industry due to popular tourist destinations like Cancún and Mérida. This exposure has led Mayan communities in Yucatán to steer off from a traditional healthy milpa diet and turn to industrialized foods. Globalization has incited a disproportionate amount of consumption of soft drinks and *comida chatarra* (junk foods) all over Mexico, contributing to the country's climbing rates of obesity among adults and children, and Mayan communities (Colchero et al., 2015). In the last decades, obesity rates within Mayan communities have spiked. To examine this trend, this manuscript explores the following research questions:

- What have been the policy and economic drivers of the change in diet in Mexico?
- How has the consumption of industrialized foods increased obesity and other poor health outcomes among Mayan adolescents and adults?

Processed Foods Within my Family and Rural Community

This topic is deeply personal to me. Having traveled to Mexico within the last five years, I have witnessed the increase in consumption of soft drinks like Coca-Cola within the community of my family on the outskirts of Guanajuato, Mexico. It was not until I visited my community of El Armadillo, Guanajuato in December of 2021 that I realized the strong grasp Coca-Cola has on the Mexican population. At my grandmother's dinner table, a two-liter Coca-Cola bottle was present every day along with other *comida chatarra*. During the 1960s and 70s, my grandmother grew up in a poor rural town, daughter to poor farmers and sister to seven siblings who had little to no economic support. Since she was a child, my great-grandparents could not provide three meals a day for my grandmother and

her six siblings. Most meals came from my great-grandfather's crops, what he planted in other's lands and what they could afford to buy. My grandmother recounts, "We ate lots of broccoli and cauliflower as it was what your great-grandfather planted most. There were times when he planted foods like potatoes, onions, and *quelite* (greens) in neighbors' lands, he was allowed to bring some home and that's what we ate during our childhood." My grandmother's family and herself rarely ate any processed foods or drinks and occasionally ate meat approximately once a week or less. "From what I remember my mother always gave my siblings and me tea for breakfast, she cooked it every morning for my father with his *pan dulce* (sweet bread/ Mexican pastry). We had a cup of lemon tea or cinnamon tea at all times of the day even before we went to sleep. It was something we drank daily," recounts my grandmother. "We knew what we were putting into our bodies because your great-grandfather planted and harvested our food. We knew that it was good for us because that was all there was for us to eat. Even with meat we knew that whoever we bought beef or pork meat from was feeding them healthy plants like alfalfa. We knew nothing about processed foods, you wouldn't be able to find any of that in my mother's house."

Since growing up, my grandmother Margarita has experienced a drastic transition from a healthy diet to a present diet filled with fatty components and largely processed foods. Presently at 66 years, my grandmother still cooks for the entire house. She prepares dishes with nutritious vegetables but also prepares meat and fried dishes frequently about three or four times a week. For example, pozole (hominy and meat stew) with pork, *carnitas* (simmered pork in oil), *gorditas* (maize tortillas filled with meat and vegetables), *flautas* (fried rolled tortillas stuffed with meat and vegetables), etc. My grandmother explains, "Now I cook many of my dishes with oil and we eat a lot more meat because we can buy it in one of the small shops in town. Those types of products are more accessible. Before, when I was a teenager, we had to go to more populated towns where they sold that, where it took us at least two hours to walk. But now that it is sold in the town, it is frequently used in our cooking." Another issue is the abnormally large consumption of soft drinks within my grandmother's household and our community, where Coca-Cola is always available more often than water. Every morning, a *vendedor* (seller) rides around town in their vehicle selling twenty-liter gallons of water. However, once they leave town, people must buy smaller two-liter water bottles from the small local shops for the rest of the day. Once there are no water bottles available to purchase, community members have to rely on Coca-Cola or juice to drink until the next morning, "There are also times when our town is having a party or at family parties when water runs out or there wasn't water to begin with. But there is never a party or family get-together where there isn't Coca-Cola or soda in general." Unfortunately, my grandmother Margarita now constitutes part of the 14.1 percent of the Mexican population that has Type 2 Diabetes.

Mexico's Legislative Efforts to Combat Obesity

Since 1980, the Americas have become the region with the highest rates of obesity and Type 2 Diabetes (T2D) in the world (Barquera et al., 2018). It has been found that Mexico is a leading consumer of excessive sugar drinks and nonessential food on a global scale (Colchero et al., 2015). Obesity rates have further accelerated following the ratification of NAFTA in 1994. According to Dr. Simón Barquera and Dr. Juan A. Rivera from the Instituto Nacional de Salud Pública (INSP), "Today 23.1 percent of Mexico 's

population total dietary energy comes from ultra-processed foods" (Barquera & Rivera, 2020, p. 746). Over two-thirds of the population exceeds the recommended amount of consumption of sugar and processed products. Abdominal obesity is present in 81.6 percent of all adults and morbid obesity (when weight is 80-100 pounds above ideal body weight) in 3.6 percent of adults (Barquera & Rivera, 2020). Additionally, among children between the ages of 5 and 19, the obesity rate is one of the highest globallywith 34 percent diagnosed as overweight or obese. With a large portion of Mexico's population classified as overweight or obese, 14.1 percent of the population has been diagnosed with type II diabetes (T2D) and 19.1 percent diagnosed as pre-diabetic. (Barquera et al., 2018, p. 2). These alarming statistics motivated the Mexican Congress to begin a plan of action.

In 2010, the Mexican government began to design a program to combat the obesity epidemic. The initiative took the form of an excise tax on sugar-excessive soft drinks and nonessential foods—more often known as dense energy foods—beginning in 2014 under President Enrique Peña Nieto's administration. Sweetened drinks received an approximate 10 percent tax increase (excise tax of $1 Mexican peso per liter) and nonessential junk food with energy density greater than or equal to 275 kilocalorie/100g received an 8 percent food tax increase (Taillie et al., 2017). These foods include salty snacks, chips, candy, pastries, cereal-based products with substantial sugar, etc. Additionally, the mentioned junk foods and soft drinks were banned from being sold in schools. Taking nutritious awareness further, in January 2020, Mexico's Congress approved front-pack labeling of nonessential foods as warning signs. Often these labels read "excessive calories," "excessive sugar," "excessive saturated fats," etc. Surprisingly, these label warning signs have gained support from the public.

However, the tactic has been opposed by food industries and suspicious cyber groups going as far as threatening advocates in favor of the soda tax and label warnings via mysterious text messages. Since the initiation of the sugar beverage and nonessential foods excise tax in 2014, a study on household purchases has shown that after two years nonessential junk food purchases per capita have decreased by 6 percent, while sugar-excessive beverage purchases per-capita have decreased by 5.5 percent within the first year of 2014 followed by 9.7 percent of the following 2015 year (Arteaga et al., 2017, p. 4; Colchero et al., 2015). Although these measures have been taken, it's important to note that the Mexican National Health's budget has suffered drastic cuts for the past ten years. As of 2020, the health budget only represents 2.3 percent of the federal budget under President Andrés Manuel López Obrador (Barquera & Rivera, 2020).

Gradual Decline of the Milpa Diet in the Yucatán

Despite the various programs and policies implemented by the Mexican government, indigenous communities like Mayan peoples now gravitate towards junk foods and have abandoned their traditional milpa diets that have been present since Mesoamerican times (Otero Provost et al., 2017). The vast majority of Mayan towns and municipalities depended on milpa harvesting for their food until the last five decades (Otero Provost et al., 2017). Milpa is an agricultural practice where a multitude of different crops are grown in the same area or side-by-side. However, the system is based on maize. A variety of vegetables are sown with maize (a source of complex carbohydrates), such as beans, a source of vegetarian protein, and chiles and squash, which are sources of trace

minerals (Levinson, 2014). The polyculture system gives community members and families food security, a balanced diet, and physical activity as well. As a Mayan woman participant of a Type 2 Diabetes study in rural community Tope, Yucatán reminisces, "Most of the time they just ate vegetables and beans with their tortillas. And then, everything was from the [home] garden or the milpa. You grew your vegetables on your land, you made your masa and your tortillas yourself, and you raised your own chickens or turkeys." (Frank & Durden, 2017, p. 67). Additionally, the manual labor of maintaining milpa crops was and is a form of exercise for many families. . In order to maintain milpa crops, husbands often spentnearly full days tending to their crops withstanding exhausting labor. Wives also had to tend to vegetable gardens and their responsibilities at home. The same participant in the Tope, Yucatán study attributes obesity to less physical activity: "But instead you can sit around all day and watch TV and drink Coca [-Cola]. And that is what people want. But then they aren't exercising, and they are eating more fatty foods. That is why everyone is getting fat." (Durden, 2017, p. 67).

Milpa agriculture began to slowly vanish in 1970 when the Mexican federal government began to build highways in rural areas, connecting them to developing urbanized cities like Mérida and Cancún. The connection to growing cities gave the Mayan peoples the opportunity to migrate and alternate seasonal jobs between the city and the countryside (Leatherman et al., 2010). At the same time, the increase in immigration and population "...led to an increase in the pressure exerted on the soil, which led in the 1990s to a reduction in fallow time in the land dedicated to the milpa." (Otero Provost et al., 2017, p. 4). However, the reduction in fallow (a farming technique where land is left without sowing for one to two years while land regenerates) instead caused a decrease in soil fertility and accelerated the growth of weeds. In an effort to combat the contagious weeds, farmers used herbicides, which unfortunately affected the cultivation of squash, beans, and chile. This forced the polyculture agricultural system into a monoculture of maize, pulling apart the once nutritious foods that consisted in milpa diets. Seasonal employment was becoming more common for Mayan workers in Cancún and Mérida which led workers and families of Mayan farmers to later permanently reside and join the workforce in the developing cities leaving behind milpa production (Otero Provost et al., 2017).

Emergence of *tienditas de abarrotes*

The disappearance of milpa production and the emergence of *tienditas de abarrotes* essentially opened the portal to processed foods and obesity in Mayan communities (Otero Provost et al., 2017). Coincidentally, within only five years of the ratification of NAFTA in 1994, a study conducted in a region known as the *maize region* (a region that consists of twenty-five Mayan municipalities) in the center-east of the state of Yucatan determined that the number of small local grocery stores increased in number from 26, 247 (1999) to 29, 948 (2004) (Otero Provost et al., 2017. p. 5). Additionally, according to Otero Provost's article, their study determined that in three of the twenty-five municipalities of Yaxcabá, Sotuta, and Chikindzonot, a growth of commercial establishments of more than 15 percent was seen (Otero Provost et al., 2017). Unfortunately, the expansion of these small local grocery stores didn't supply or provide Mayan communities with diverse nutritious foods once a part of their diets. Essentially, the transition to industrialized foods with low nutritional value directly correlates to the loss

of traditional agricultural practices of rural communities (Otero Provost et al., 2017).

Obesity in Rural Mayan Adults

Yucatán's health as a state has deteriorated as the National Health and Nutrition Survey of 2006 shows that 74.2 percent of adults (above twenty years of age) in urban regions and 76.3 percent in rural areas were classified as overweight or obese (Becerril, 2013). Even the smallest rural Mayan communities in Yucatán have been infiltrated by obesity with alarming numbers. In Marín's study, an investigation was conducted in the small Mayan community of Dzutóh belonging to the municipality of Tixméhuac, Yucatán. In this community of 126 inhabitants, traditional celebrations like religious ceremonies and also the cultivation of milpa crops still continue. Although the community of Dzutóh actively produces milpa crops, the excessive consumption of processed foods hasinfluenced a nutritional imbalance in their diets. It's important to note, the community is also classified in the range of extreme poverty. In the study, the researchers weighed and took the height of 109 of the 126 Dzutóh inhabitants and calculated their health status according to the *indice de masa corporal* (IMC) or body mass index (BMI). Of the 109 participants, 20 men and 36 women were classified in the adult group (older than 19 years of age). According to the weight and height ratio and the BMI scale of the adult group, it was determined that of the 56 adults, 80 percent of men and 86.1 percent of the women were obese while only 15 percent of men and 2.8 percent of women in the adult group were determined to have a normal BMI (Marín et al., 2013, p. 75).

Additionally, the types of industrialized and traditional foods were recorded along with the number of times eaten a week. Among the foods that the study survey provides is *refresco embotellado* (bottled soft drink) to which 9 of 21 respondents claimed to drink daily, 8 out of 21 respondents claimed to drink three to four times a week and 4 of 21 respondents claimed to drink the beverage one to two times a week (Marín et al., 2013, p. 76). On the other hand, the traditional indigenous beverage of *atole de masa* (a warm cornmeal drink) was also included in the study where 9 out of 20 respondents claimed to drink daily, 0 respondents claimed to drink three to four times a week, and 11 out of 20 respondents claimed to drink the beverage one to two times a week (Marín et al., 2013, p. 78). The food survey concluded that dietary changes in rural communities are leading to frequent consumption of industrialized foods. Rural Mayan communities across Yucatán are unfortunately experiencing the same health epidemic as the citizens of Duztóh.

Eating Habits of Rural Mayan Adolescents

Since 2006, studies have shown that rates of obesity have increased in Yucatán adolescents in urban localities from 43.5 percent in 2006 to 42 percent in 2012 and jumping to an astonishing 52 percent as of 2019 in rural localities (Pérez-Izquierdo et al., 2020, p. 4424). In the previously mentioned study, a total of 292 students between the ages of 12 and 14 enrolled in 4 high schools in the localities of Uayalceh, Mucuyché, Temozón Sur, and central Abalá in the municipality of Abalá, Yucatán (composed of 8 distinct indigenous localities, which 40 to 60 percent of the entire population fall between poverty and extreme poverty). Students were then weighed and measured to determine their BMI and a select few were given a food consumption frequency questionnaire to determine their daily dietary intake. Of the 292 students, BMI scores determined that 58.2 percent of participants were classified as normal and 41.4 percent were classified as overweight and obese (Pérez-Izquierdo et al.,

2020, p. 4428). Of the students whose BMI was in the range of overweight and obese, 58 students were randomly selected and given a food consumption frequency questionnaire. The results of the questionnaire demonstrate that over 50 percent of those surveyed consumed industrialized unhealthy foods at a high or moderate frequency. Sugar showed an 83 percent consumption rate, mayonnaise a 74 percent consumption rate, juice a 64 percent consumption rate, and soda beverages a shocking 88 percent consumption rate (Pérez-Izquierdo et al., 2020, p. 4430-4431). An additional focus group interview was conducted with the students to understand their perceptions of what they consumed throughout the day.

Three participants from the "Daniel Ayala Pérez" high school in the central municipality of Abalá, Yucatán recall what they consume at school:

> *...at school we eat what they sell, and what they sell can be tortas de carne asada, tamales, hamburgers, spaghetti, nissin® soup, panuchos, hot dogs, sandwichón, soufflé, garnachas, tacos, rice pudding, empanadas, we also eat chips and cookies, ...we drink water, tamarind water, horchata water, hibiscus water, sweetened juices (friolín®), sometimes Coca-Cola®... We don't like those foods we eat, because they don't have flavor, that's why we buy the chips and cookies. And are those foods that you eat at school good? No, because they have a lot of calories, they have a lot of saturated fats and condiments... So, why do they buy those foods? Because there is nothing else… (participation of students from the three school grades).* (Pérez-Izquierdo et al., p. 4433).

The interview discussions allow us to infer that Mayan adolescents are aware of the threats and diseases that the consumption of industrialized foods can pose to their health, but they also don't have other options whether it be the availability of healthier meals or the financial support to buy fresh foods.

Conclusion

While there has been some success among public health officials to combat poor health outcomes, obesity and diabetes remain significant health issues in Mexico (Barquera and White, 2018). For decades globalization and the influence of industrialized foods have slowly deteriorated the health of indigenous communities in Yucatán, México, especially in Mayan communities. Mayan communities have steered off the traditional milpa diet in favor of processed food produced and distributed on a global scale. Although there are very few available studies on the impact of the transitional diet in indigenous communities, it is clear that the urbanization in Yucatán during the 1970s led indigenous communities to the exposure of diseases previously uncommon to them. It is clear that the enactment of NAFTA coincided with the incremental availability of modern industrialized foods in Mayan indigenous communities. Mexican president Andrés Manuel López Obrador has imposed budget cuts to the federal health budget as of 2020. Unfortunately, there is no evidence that the Mexican government will carry out effective legislation and programs that will help Mayan communities combat the health crisis or if indigenous peoples will continue to be engulfed by the effects of industrialized foods.

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