

Sweet Extermination: How Soda and Beer triggered an epidemic of diabetic disorders among the Highland Mayans of Chiapas, Mexico

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Abstract

Setting: In the Highlands of Chiapas, Mexico, a high percentage of Mayans have now substituted high calorie drinks in the place of water. The excessive consumption of soft drinks and beer have now triggered an epidemic of diabetes mellitus. We undertook this study to better understand the perceptions that Mayan diabetics have about Coca-Cola and beer.

Methods: It has been estimated that the daily diet of Highland Mayans provide them with from 3566 to 4488 Kcal daily if we include the large quantities of soda or beer which have become part of their diet. If we add in the additional 788 to 985 kcal from sweetened beverages, we obtain a total diet that exceeds 5000 kcal per day. Six brief case studies illustrate the role of sweetend drinks in

Conclusions: Indeed, more Coca-Cola is consumed in Chiapas than any place else in the world: 683.8 liters per person per year. In the United States soda and beer consumption per person and per year is far less: 98.4 liters.

The Diet in the Highlands

Outside of minor variations, the common diet among the Mayas of the Altos de Chiapas is characterized by the predominance of high-calorie foods such as nixtamalized corn tortilla (boiled with lime and ash) or industrialized corn flour tortilla (Maseca), beans, eggs, bread, posol (nixtamalized dough diluted in water), noodle soup; few vegetables and fecculations, among which blackberry, chard, carrot and potato predominate; in season, green beans, zucchini, pumpkin flower and chayote, occasionally chicken and sporadically beef or pork.

In a course / workshop on DM aimed at tsotsile and tselal health promoters held in 2015, a list and the corresponding quantities ingested per day were prepared based on what the attendees pointed out as foods that make up the day's diet. With this list, the caloric Kilo calculation was made corresponding to the the daily consumption of an adult person , which resulted in a range that goes from 3566 to 4488 Kcal (Table1). This without considering the daily consumption of beer and fried drinks that will be variable among the members of the families and as will be seen in the next section constitutes a very high contribution of kilo calories per day.

On the other hand, the ideal size and average weight of the Mayan population in El Alto has been studied for the age range between 25 and 60 years (Table 2). From this data we can see how - after the age of 45 - daily caloric needs diminish (700 and 1550 Kcal). Clearly, caloric needs will vary according to physical activity, increasing to as much as 3000 Kcal during intense physical activity (work and sport).

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Table 1: Four possible daily diets with amount of calories

Food Source	Kcal. X 3.52 ounces	Ounces	Kcal. X day	Diet 1	Diet 2	Diet 3	Diet 4
Industrialized maize tortilla	193	31.74 a 42.33	1737 a 2316	1737	2316		
Hand made maize tortilla	237	31.74 a 42.33	2133 a 2844			2133	2844
beans	127	7.5	254	254	254	254	254
noodles	91	3.52	91	91	91	91	91
posol	189	10.58	567	567	567	567	567
bread	281	3.52	281	281	281	281	281
Scrambled eggs	201	10.58	603	603		603	
Boiled eggs	155	3.52	155		155		155
vegetables	32	3.52	32	32	32	32	32
chicken	219	3.52	219		219		
pork	273	3.52	273			273	
beef	264	3.52	264				264
Total, Kcal.				3566	3915	4234	4234

World's leader in Coca Cola consumption

In Chiapas Coca-Cola®-FEMSA is the dominant producer of soda with an oversized presence in High Land Chiapas; when we talk about soda we refer only to it amongst all soda brands.

To understand the role of *Coca Cola* in Chiapas it is necessary to examine how the company operates and how this has affected the Highland Mayans.

Research conducted by Blanding (2010: 290) found that based on total population most countries, average yearly *Coca Cola* consumption was 100

cups (.25 liters); in the United States average yearly consumption was 100 liters, while in Mexico it was 150 liters.

This means that in 2010, Mexico with a population of 978,073 habitantes (<http://cuentame.inegi.org.mx/>), had a mean consumption of *Coca-Cola* per person, per year of 3,285 cups, the equivalent of 821.25 liters making it the highest consumer of *Coca Cola* in the world. with consumption of 2.25 liters daily.

As a consequence this dark drink - *Coca Cola* - added some 788 to 985 kcal to the “normal” Mexican diet. This amount of sugar reduces caloric needs while also reducing the quantity of nutrients available. For the population as a whole this mean a

Table 2. “Normal” Caloric needs stratified by age and weight

Weight / Age	<25 (+300)	26-45	46-55 (-100)	56-65 (-200)	65> (-300)
35	1175	875	785	685	575
40	1300	1000	900	800	700
50	1550	1250	1150	1050	950
55	1675	1375	1275	1175	1075
60	1800	1500	1400	1300	1200
65	1925	1625	1525	1425	1325
70	2050	1750	1650	1550	1450
75	2175	1875	1775	1675	1575
80	2300	2000	1900	1800	1700

. Notes on Table 2:

- Ideal weight x 25
- < 25 years add 300 Kcal to the range of 26-45.
- between 25 and 45 years no operation.
- between 45 and 55 years subtract 100 Kcal to the range of 26-45.
- between 55 and 65 years old 200 Kcal to the range of 26-45.
- more than 65 years, borrow 300 Kcal to the range of 26-45.

Source: Prepared by the authors based on data from Bienestar Salud <http://bienestar.salud180.com/salud-dia-dia/cuantas-calorias-debes-consumir-al-dia> Consultation 8/06/15

- more than 65 years, borrow 300 Kcal to the range of 26-45 .

Source: Prepared by the authors based on data from Bienestar Salud <http://bienestar.salud180.com/salud-dia-dia/cuantas-calorias-debes-consumir-al-dia> Consultation 8/06/15 .

Source: Research data

Ak'chamel tsotsil word for sorcery.

daily increase of 5113.7 kcal (when a man in his 50's needs only between 950 to 1800 kcal. This one statistic is enough to explain the high prevalence of diabetes mellitus in the highlands, where it has become the principle cause of death in the past 10 years.

The production of Coca-Cola in San Cristobal de las Casas

In order to reach sales targets *Coca Cola* uses the following strategy:

San Cristobal is the political, administrative and economic center of the Highlands. *Coca-Cola*®-*FEMSA* runs one of the two largest bottling companies in Mexico. The company is registered under the name “Inmuebles del Golfo S.A.de C.V. The other facility is located in Apizaco, Tlaxcala.

The bottling factory sites on a sloping plain coming down from an old volcano known as Huitepec. The volcano is the source of water for the

plant, a fact recognized by the local population.

The factory was registered in 2008 and with the water available from the volcano it can bottle some 120,000 liters of Coke in a day. Per year over 43 million liters of Coke are produced.

Taxes & other costs

Coca Cola pays not a penny to the State for all this free water, nor does it pay anything to the town of Chiapas.

This exoneration from taxes was agreed upon by three Mexican presidents - Ernesto Zedillo, Vicente Fox and Felipe Calderón - all of whom made sure that Coca Cola employees were named to key positions

During the presidency of Zedillo, Luis Téllez Kuenzler was named Energy Secretary. He left to assume the post of Secretary of Communications and Transportation. He is now working as a “proprietary advisor” to FEMSA, a multinational beverage company composed of the Coca-cola

bottling factory (largest in the world), OXXO convenience stores, and an important investment in Heineken (http://es.wikipedia.org/wiki/Luis_T%C3%A9lez consultado 2/06/2015).

Vicente Fox, Mexican President from 1970 to 1979, worked in Coca Cola from 1970 to 1979. He was National Director of Operations and President of the company's Latin American division. (http://es.wikipedia.org/wiki/Vicente_Fox consultado 2/06/15).

For the purposes of this study, the most important player in San Cristobal was Cristóbal Jaime Jáquea who was Mexico's National Commissioner of Water, a post he held shortly after leaving Coca Cola. Under his regime Mr Jáquez ceded to Coca-Cola-FEMSA the extraction of Chiapas' water for 20 years at no cost to the company. The company was exonerated from paying taxes and other charges (Blanding 2010:167).

Table 3: Caloric value of beer

Size	One beer	Two beers	Four beers	Six Beers	Ten beers
How many beers	Kcal in one beer	Kcal in 2 beers	Kcal in 4 beers	Kcal in 6 beers	Kcal in 10 beers
355 ml	150	300	600	900	1500
940 ml	397	794	1588	2382	3970

Source: Evaluation of beers available in Chiapas by the author

The next tables show the results of our investigation into the proximal causes of diabetes (Table 4) and what we considered as the triggering causes of diabetes (Table 5).

Table 4. Attribution of direct cause of DM in three localities in Chiapas

Direct cause	Chamula	Tenejapa	SCLC
Coke-rage	1	0	2
Emotions	2	1	4
Coca-Cola	1	2	0
Coca/beer	2	4	0
Beer	0	1	0
<i>Ak'chamel</i> */emotions	4	2	0
Heredity	3	5	8
No data.	1	0	0
Obesity	0	0	2
Total	14	15	16

Table 5. Attribution of direct cause of DM in three localities in Chiapas

Triggering cause	Chamula	Tenejapa	SCLC
Emotions	8	6	7
Coke/emotions	3	2	3
<i>Ak'chamel</i>	1	0	0
Violence	0	3	0
Malnutrition	0	0	2
No data	2	4	4
Total	14	15	16

The origins of Coke production in San Cristobal

In 1939, the ladino municipal secretaries were replaced by younger, Mayan men who had been taught to read. Some of these new secretaries accumulated power to such a degree that they managed to control local politics, religious organizations, and the key economic actors among the Mayans.

This was the case in Chamula, where a group called *caciquil* formed into gang known as *Tuxumetik*. Their leader eventually was recognized.

Blanding described the situation in these terms:

In many communities, the same caciques that had monopolized production of pox retained the concessions to Coke and later Pepsi. In some, such as Amatenango, concessions were granted politically [...]. Those owning the concessions of the soft drinks became rich, reaping huge profits in villages with little other commerce or industry, and passing the concessions along to family members to create dynasties. Before long, however, the increasing use of soft drinks brought its own problems-tooth decay, diabetes, and obesity. (Blanding, 2010: 157-158)

In an interview with Carlos López Gómez, son of Salvador López Tuxum discussed how various soft drink companies sought out his father to offer him concessions.

Initially, the drinks were transported by mule. Despite transportation difficulties, this was a profitable business which grew rapidly. At some point Coke and Pepsi put pressure on his father to

pick only one drink to sell. As Coke was doing better at the time, this is what his father chose. (López Gómez 2007. Tomado de Jordan 2008: 74).

The Coca-Cola® Company-FEMSA maintains an enormous factory in San Cristobal de Las Casas, situated on the skirts of an ancient volcano known as 'Huitepec' that contains substantial amounts of water, locals asseverates is a "water volcano."

In 2008 with the extracted water, FEMSA-Coke produced 31,700.64 Us gal. of soda every day (Coke, Fresca, Fanta, etc.) that is 11,570 , 735.84US gal. for that year.

Taxes and other fees

The company pays no taxes and no other fees for the extracted water to the federation or the city, that's because during the presidency of Ernesto Zedillo, Vicente, and Felipe Calderón, had State secretaries who previously were FEMSA-Coke employees. From these Luis Téllez Kuenzler stands out, who during Zedillo presidency was the Energy Secretary, and with Calderón of communications and transportation, after that, he became «main counselor of FEMSA (Mexican Economic Development) leading enterprise in Latin America conformed as Coke, owner of OXXO stores and important investment in Heineken

» (http://es.wikipedia.org/wiki/Luis_T%C3%A9llez_Kuenzler consulted 06/02/2015).

As well, Vicente Fox, former Mexican president, worked as Coke CEO for Latin America, from 1970 to

1979 (http://es.wikipedia.org/wiki/Vicente_Fox consulted 06/02/15). But the most important is Cristobal Jaime Jaquez , who previously was general director for Coca-Cola® Mexico, during Fox government was National Commissioner for Water, in that Management FEMSA-Coke received 20 years concession to extract water for free in Mexico. (Blanding 2010: 167).

Coke in High Land Chiapas

In 1939, the *ladino* municipal secretaries were replaced by Mayan, who in a few years constituted important cacique groups that eventually controlled municipal politics, religious structure and economics. That 's the case in Chamula, led by the group called *Tuxumetik* who got this designation from the group *lieder* (Favre 1973: 74, Robledo 1987: 69-70, Page 37 37-38). As Blanding states:

In an interview that Jordan made to Carlos Lopez Gomez, son of Salvador Lopez Tuxum, I state employees from d That Coke, Pepsi and different beer companies Offered His father the concession of Their Products. They started bringing product by mule, and people walked long distances to buy. Sales went up rapidly. At a certain point, Coke and Pepsi, wanted to choose one or the other, so my father went with Coke which was the highest selling at the time.

Importance of Coke in social and religious life in High Land Maya Communities

In the decade if the 1960's while the *Tuxumetik* obtained their concession of Coke, Pepsi and beer, other forces were also at work in the Highlands. This was the high point of Protestant Calvinist groups and their proselytism, characterized by the demonization and persecution of traditional religions and *pox* (rum) drinking, In time this impacted on the Mayan world view and with it, their ritual practices. Alcoholic drinks were now banned and were replaced by Coke or other soda brands, in the process oneiric revelation played an important role, impacting on the dream that *tsotsil j- ilol* received :

First, you were given pox, but now I came to tell you that you must not drink it, I came to take it away from you. Pox is not

ours (heavenly deities), it belongs to the enemy (demon) , and I tell you so, to keep it in your mind. (Don Antonio, testimony in Page, 2011: 351)

The incorporation of Coke into ritual offered the drink a high status, not only in religious life but also in social events. It's important to note that deities are nourished from the heat produced by candles, incense, and prayers, and by the sugary smell that in the past came from *pox*, was substituted by soda which has similar qualities. (See Page , 2011).

Religious proselytism impacted the double functions of the deities. The most important change was that the dieties now only protected humanity; it was only demons who damage and exterminate.

This, of course, generated practical changes. Those who had the sacred commandment could only be sons / daughters of God or the demon, concomitantly, sacred matter changed. Alcoholic drinks were given to the devil, because of its demonization, and soda, (mainly Coke) incorporated as sacred food for heavenly deities. (Page, 2011: 310-311)

Marketing

In Highland Chiapas, Coke markets mainly through billboards which emulates the association between political life, (like the one we found in Tuxtla Gutierrez at the entrance coming from San Cristobal and ritual performance (as one can see at the entrance of Tenejapa, Chamula and Zinacantan). Part of publicity is to situate posters in *tsotsil*, or *tsestal* in public places emphasizing low prices. Low prices, which have been referred to as "accessible prices" (Javier 2008, in Jordan 2008) 76), close the strategy. In 2010, a 6 liter bottle of Coke cost 7 to 8 pesos in San Cristobal; in Chamula and Tenejapa the price was \$ 4.50 or \$ 5.00 pesos.

Sacred associations, low prices, and high energy push soda into the daily diet, while dislodging nutritive food from the table (Jordan, 2008: 145).

The quantity of Coke offered in a social or religious event, varies from 3 or 4 cages to 100 (each cage has 24 bottles) . (Blanding , 2010: 158-159).

Six case studies:

The others collected six case stories of how sweetened beverages were thought to have been a proximal cause for their illness.

Maint

When the illness of Maint, a 26-year-old tselal woman from Tenejapa, (López Gómez 2007. Tomado de Jordan 2008: 74). started, she initially had no emotional problems. She attributed her type 1 diabetes to the chronic intake (for years) of junk food. Every day before school, she had a breakfast based on beans, eggs, coffee and bread; The rest of day, two or three Cokes, cookies, and packed potato's.

At age 16, she collapsed at school, and from then on, she has felt that her life is no longer her own.

Yes, yes, my illness started eight years ago, I was in the classroom (high school). I felt faint, wanted to vomit, and it hurt to urinate, then I got a fever In one week, I lost all my strength and got very slim. (Maint, quoted in Page , book in press)

Her family took her to the hospital, and once she started taking insulin, she consumed no junk food.

Kay

Kay is 59-year-old man from Chamula who felt an enormous rage after he had his maize stolen in 2002. For 15 years he drank enormous amounts of Coke and considered it the most important part of the meal

I have said that people in Chamula are confused in relation with "sugar." It is affecting a lot of people and they do not know if it comes from intensive rage or from drinking massive amounts of Coke.

He said that when his brothers were fulfilling religious duties, they got "sugar" because of Coke and that caused their death; the same happened to his sister

I got sick by drinking excessive amounts of Coke for 15 years. At mealtime Coke was the most important part of food.

When I started with acute thirst and polyuria, I drank four Cokes .

I had a community commandment, and

with that one day I started with a lot of thirst, so I drank four Cokes and could not sleep that night because of intense urinating. Then I realized that this was not normal. A woman advised me to take the same herbs That her father was using for "sugar" so I started and stopped drinking Coke.

Linen

A 45-year-old man from Chamula came down with "sugar." When I was working in Cancun, even through he had to keep drinking Coke to get rid of my hunger and achieve energy. His condition got worst land he lost 40 pounds. When he went to the doctor his blood measurement was 585 mg / dl.

I have thought that diabetes comes by not eating , excessive happiness and rage.

Hernan

A man from Chamula, 53 years old. Before having "sugar" I drank lots of Coke, Fanta, and Pepsi, three or four a day, I drank no water.

Copa

Recounted:

"I did not take care of myself, I used to eat cookies, sabritas , and lots of Coke, Coffee and beer. In such sense, I'm the one that's guilty . "

Gochez

Various people told him that he had "sugar" because of his Coke addiction:

When I was hungry, or thirsty I would buy bread and Coke, or only Coke "it was my favorite soda," but I've also heard that one can get "sugar" from anger, but I did not recall getting angry.

Beer

Several diabetic men in our study believed that their disease was caused by drinking enormous amounts of beer. (This is mentioned here because it is a common belief.)

In Mexico, a 12.0 ounce beer has 150 kcal. A beer known as "Caguama" contains 31.8 ounces

and has approximately 397.2 kcal.

An occasional beer does no harm to either healthy or diabetic persons, although its ingestion with the intention of drunkenness is harmful, particularly when the drinker tries to sustain his inebriation for days and weeks. This degree of alcoholism is more common in men than in women. Men with drinking problems can have a very high caloric intake going from 1500 to 3970 kcal. per day.

Joco

A 36-year-old diabetic male got sick of diabetes at age 20, in 1984. At the time, he and his father worked building roads in Chiapas.

I started in that job at age 16, as machinery custodian. And beer, was part of everyday work.

Every other day at nightfall, one or some of his fellow workers started drinking beer, and the rest of the workers would follow, spending all the money they had, and paying what they owed on pay day.

I used to drink three or four days in the week, that was the way we worked, even the boss and his subaltern drank. We all drank. So, I do not know, maybe that was the cause.

He thinks that beer intake was a very important foundation for his illness, a shocking scare was the trigger.

That bulldozer was going to flatten a house, but the terrain was inclined and slippery, it slowly fell to the edge of the road, and since I was responsible for the machinery I got very scared. My sight went dark, I fainted. When I came back, I saw that the bulldozer was safe in other level. That's when diabetes started, that's when I knew there's a god.

Al

Was sure that his diabetes came from an excessive beer intake, noting that the day before his symptoms appeared he and a friend consumed a great amount of beer over the course of two weeks.

Three times after being in the hospital, and achieving complete recovery, he relapsed into the same behavior.

I consider that diabetes is the result of unhealthy habits, and has nothing to do with religious or supernatural aspects.

Final Considerations

The subordination and exclusion impacting the native Mayans leads to the imposition, incorporation and persistence of practices, some of which, in my opinion, are deliberately designed to do more harm than good. Among these we have soda, beer, and the pseudo-food industry (cookies and packed grease carbohydrates) In Mexico the food industry operates with no restrictions, even though the damage it produces is socially recognized.

Backwardness with respect to education and medical attention, is combined with the restraint that caciques impose by controlling religious and civil institutions. They have the concessions of Coke, Pepsi, assorted brands of beer and *pox* (liquor). A variety of different mechanisms serve to reinforce the need to consume their products on a daily basis. Marketing strategies, centered in *tsotsil*, *tseltal*, or other language publicity, and the creation of accessible prices, predominates the public discourse.

For example, the consumption of coke is part of ongoing proselytism. Pastors of different religious congregations, the Calvinist state, and churches have as their goal is to break up all religions characterized by practice that seeks a confluence of traditional religiosity and Catholicism. This is done through discrediting and satanizing existing churches. This campaign has generated significant changes in the fundamental cultural and religious beliefs of the Highlands. Traditional practices are changed in what that allow them to persist in a globalized world.

Given the lack of formal education, religions, and social pressure, the population easily wakes up to face of Coke advertising, potentialized by a drink that is ostensibly invigorating, the result of high content of carbohydrates, caffeine and other substances. On the social level, status is obtained when the persons or groups offer the product in different kinds of social, family, political or religious events.

The excessive soda that these customs have generated, in high prevalence and mortality, as continually asseverated for Chiapas population, is the lack of legality, or when the non-application of the governmental instances responsible for it.

It is also alarming and distressing that at the international planning level, diabetes is not a priority mentioned in the Millennium goals (NCD Alliance, 2012), nor are they found in Mexican goals stated in the Sector Health Plan 2012-2018 (Government of the Republic 2013). Attention to these problems, is limited to prevention, which after five years of this government they have not at all been implemented, because that public medical services operate through an acute disease model.

Some of the collaborators in this study now forbid the intake of soda in their homes. They suffer from diabetes, and seek to prevent this disease in the family. The fact that this attribute is soda as damaging for health is circulating in social nets, on the basis of experience and symptomatology related to diabetes.

[...] *Just soda, but it is very sweet Why? Because it only contains sugar, that's what it hit us, blood turns into sugar. A friend of mine told me that we must not drink soda, that we must avoid it. For thirst, we have water. Caffee can be consumed with no sugar, also tea. That's much better. (Lorenz (audio)*

Concerning beer, we must state that the role of alcohol in triggering and generating of the hyperglycemia that comes from excessive intake is not emphasized. It is not enough that television publicity, and other mediums of commuication repeat the message "consume moderately", and not enunciating the risks that excessive can provoke *Ak'chamel* tsotsil word for sorcery.

In conclusion, the reader can see in the next tables the results of the research associated to this paper related with what the collaborators attribute as direct (Table 4) and triggering causes of diabetes (Table 5).

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