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TV food advertisements' effect on food consumption and adiposity among women and children in Mexico

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Abstract

Background: **The objective of the study was to assess the association between TV foods advertisements and the ones consumed by mothers and children, and the body weight of both mother and child, among population from different SES in two Mexican cities.**

Methods: **During June through October 2011 in Tijuana and Tuxtla Gutierrez, two national broadcasted channels were recorded during a period of 5 h in the afternoon on working days. Direct interviews were conducted to explore the foods consumed by mothers and their children from january to july 2012. To identify the difference in the number of hours of TV watching, number of TV sets, and the number of advertisements they recalled, a one-way ANOVA was used.**

Results: **An association was observed between the consumption of advertised foods by mothers and the frequency of broadcasted advertising. It was also observed that there was an association between the hours watching TV and BMI of the mothers and BMI Z-score of their children.**

Conclusions: **There was an association between BMI of the mothers and their children and time spent watching TV. The high exposure to TV food advertisements in Mexico may increase the odds for having childhood obesity.**

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Key words: *TV. Obesity. Children. Food Advertisements. Women.*

EFECTO DE ANUNCIOS DE ALIMENTOS EN LA TV SOBRE EL CONSUMO DE ALIMENTOS Y LA ADIPOSIDAD EN MUJERES Y NIÑOS EN MÉXICO

Resumen

Antecedentes: **El objetivo de este estudio fue valorar la asociación entre los anuncios de alimentos en TV, los alimentos consumidos por las madres y los niños, y el peso corporal de madres y niños entre población con diferentes niveles socioeconómicos.**

Métodos: **De junio a octubre de 2011 en Tijuana y Tuxtla Gutiérrez, se grabaron los programas de dos canales nacionales durante un período de cinco horas, cinco días laborables. Se realizaron entrevistas a las madres de enero a julio de 2012, para explorar los alimentos consumidos por las madres y los niños. Para identificar las diferencias entre el número de horas de TV, el número de unidades de TV, y el número de anuncios que recordaban se realizó análisis de una vía de ANOVA.**

Resultados: **Se observó una asociación entre el consumo de los alimentos anunciados y la frecuencia en la que se anuncian en la TV. También se observó una asociación entre las horas de televisión, el IMC de las madres y el puntaje Z-score de los niños.**

Conclusiones: **Se observó una asociación entre las horas de televisión y los indicadores de adiposidad en las madres y los niños. El mayor aumento en la exposición a la TV puede incrementar el riesgo de obesidad infantil.**

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Introduction

Northwestern Mexico has the highest rate of obesity among pre-school and elementary school children[1]; in addition, in the Southeast and the northern part of Mexico an extremely high prevalence of overweight obesity among lower than 2y old children from low income families has also been reported[2], making obesity one of the main problems in public health.

In addition to genetic causes, different authors have pointed out the importance of environmental contingencies in the development of obesity[3-5]. It has been suggested that TV viewing plays an important role as an environmental factor for the development of obesity which has led to different regulation proposals for the commercial promotion of food targeting children[6]. However, in addition to the lack of compliance of the regulations made by governments in some countries or to the food industry self-regulation, food advertisement geared to adults might contribute to an increased consumption by both parents and children[7]. In a study conducted among low income mothers in the northwestern part of Mexico, it was found that the higher the number of advertisements during the programs geared to adult populations, the higher the consumption of these foods by children[7].

The objective of the study was to evaluate the frequency with which food advertisements are aired in programs targeting the adult population from low to high socioeconomic status from two Mexican cities (from the northwest and from the southeast) of the two TV public broadcast channels with the highest audience, and to assess the association between the foods advertised and the ones consumed by mothers and children, and the body weight of both mother and child.

Methods

Settings

Baja California (known as Baja) is the most northwestern Mexican state and it borders the US state of California. According to the 2005 census, Baja had approximately 2, 844, 469 residents and the human development index was 0.77, ranking seven out of the 31 states of Mexico. Approximately 72% of the population had less than 600 dlls of monthly income. Tijuana (TJ) is located in the Mexico-US border and is the largest city in the Mexico-US border, accounting for more than 50% of the state's population[8].

Chiapas is a southeast Mexican state and it borders Guatemala. According to the 2005 census, Chiapas had approximately 4,293,000 residents and the human development index was 0.58, ranking last among all states of Mexico. Approximately 90% of the population had less than 600 dlls of monthly income. Tuxtla Gutiérrez (TX) is the largest city in Chiapas and is located 224 km from the Mexico-Guatemala border; in 2005 it had approximately 502,320 residents[8].

Subjects

Women with children less than 6y of age, recruited at education and health facilities, participating in this study.

Questionnaire Contents

Sociodemographic data

A questionnaire was administered to the mothers to obtain data about their age, level of education, age and sex of their children, and their weekly income.

Dietary and TV watching habits. A previously validated questionnaire was applied [7] from January through November 2012.

Direct interviews were conducted to explore foods consumed by the mothers and their children during the months of January through July 2012.

TV recording

During the months of June through October 2011, national broadcasted channels (TV2, TV13) were recorded, during a period of 5 h in the afternoon on working days (WD) (17:00 to 22:00 h). These time periods were selected because it is during these hours that women are most exposed to television and is also the period of highest audience. The national and local networks broadcasted were recorded in TJ and TX.

All of the food advertisements were counted and classified in two categories of food and non-food types.

Anthropometrical Measurements

Children's and mother's weight and height were obtained using a TANITA scale, model Scale Plus Body Fat Monitor UM - 028 (Tokio, Japan). Each subject was wearing light clothing and asked to take off their shoes when stepping on the scale; the final measurement was rounded to the nearest 0.1 Kg. A portable stadiometer, brand Seca, model 214 (Hamburg, Germany) was used to measure the mothers and their children. Waist circumference (WC) was measured using a 205 cm retractable measuring tape, brand Seca, model 201 (Hamburg, Germany). Calculation of BMI z-scores by age and gender were obtained using the WHO criteria, and the children were classified according to these z-scores as having: severe malnutrition (≤ -3 SD); malnutrition (-2.99 SD to ≤ -2 SD); normal weight (-1.99 SD to ≤ 1SD); at risk of overweight (> 1 SD to ≤ 2 SD); overweight (> 2 SD a ≤3 SD); and obesity (>3 SD). Body mass index (BMI) was calculated according to the Quetelet formula, BMI = weight (kg)/ height^2 (m). The stages of weight were calculated according to the criteria established by the

WHO as: underweight (< 18.5 kg/m^2); normal weight (18.5 a < 25 kg/m^2); overweight (25 a < 30 kg/m^2); and obesity (≥ 30 kg/m^2). All the anthropometric measurements were taken at the time when the mothers were interviewed.

Statistical Analysis

The program Anthro (v 3.2.2, WHO, 2007) was used to evaluate the children's weight and height according to age and sex. With the statistical program SPSS, version 17.0 for Windows, the analysis of the data obtained was performed.

The frequency of overweight and obesity was calculated according to the mother's BMI and the BMI z-scores for the children.

Frequencies of the consumption of advertised food by mother and child, demographic data, and advertisements on TV were calculated. Also calculated were means and standard deviations of age, BMI, and hours of TV watching. The Spearman correlation was used to assess the correlation between the frequencies of foods advertised on TV and the foods advertised consumed by mother and child.

To identify the difference in the number of hours of TV watching, number of TV sets, and the number of advertisements they recalled, looking specifically at women with different levels of education and weekly income, a one-way ANOVA was used. The association between hours of TV watched, having a TV set in the bedroom, and being OW or OB or having Abdominal Obesity was assessed with a Chi-square test. If the association was statistically significant ($p < 0.05$), the odds ratio was calculated using simple logistic regression.

Results

Demographic data: Seven hundred and twenty one, 19 to 51 years old (mean age 29 ys), mothers participated in the study. Seventy two percent were housewives, seventeen per cent were laborers, six per cent were graduate professionals, and four per cent were tradeswomen. Eighty per cent of the fathers were laborers; twelve per cent were graduate professionals, and eight per cent tradesmen. Forty three percent of fathers and 37% of mothers had at least high school, and seventy one percent of the households had less than 500 dlls of monthly income. Similar to the income distribution at the national level[8].

Anthropometric data: Overweight was 34.0 and obesity was 27%. Four hundred and twenty one children, 3 to 72 months of age (mean: 49 ± 18 months), were measured; 52% were females. Children with risk of OW were 20%, with OW 11% and with obesity 10%.

Recording of TV advertisements: A total of 245 hours of TV programming were recorded, registering a total of 10,643 advertisements, 26% of them were food ads. An average of 7 to 8 food advertisements were transmitted every 30 minutes of programming. The most frequently advertisements broadcasted were milk and milk products (17%), sweetened beverages (10%), salted snacks (9%), pastries (8.8%), sweets and chocolates (6.0%) and juices (5%).The least advertised foods in both states were fruits and vegetables (3%). Advertising of water contributed to 4% and fruit and vegetables to 3% of total food advertisings.

TV watching habits: Ninety nine percent of households had a TV set. They also had a mean TV set of 1.88. Seventy three percent of households had a TV set in the bedroom, with more in TJ (84 vs 49.5%, $p = 0.0001$) than in TX. Soap operas (telenovelas) were the programs watched the most (78% of those interviewed). The average time of watching TV was 2.7 ± 1.5 h a day during an average of 5.9 ± 1.7 days a week and a mean program watched of 2.5 ± 1.7 programs/day. Ninety five percent of children watched TV an average of 2.7 ± 1.6 h/day. Sixty seven per cent of mothers watched TV while having breakfast, lunch or dinner. Forty six percent had food or a drink while watching TV. The foods eaten more frequently while watching TV were salted snacks (28%), home prepared foods (17%), and sweetened beverages (13%). While the foods advertisements the mother remembered the most were sweetened drinks (30%), fast food (19%), salted snacks (17%), pastries, cookies, and sweetened cereals (13%). Advertisements of water were reminded by less than 1%.

Food consumption and food advertising: It was observed that there is an association between the weekly mean consumption of advertised foods by mothers and the frequency of broadcasted advertising in ($r = 0.79$, $P = 0.0001$). Further, an association was observed between the weekly mean consumption of food by children and the advertised foods ($r = 0.79$, $p = 0.0001$).

TV watching: A small positive association was observed between the mother's time of watching TV and their children's TV watching ($r = 0.25$, $p = 0.0001$).

It was also observed an association between the hours watching TV and BMI Z-scores by age and sex of the children ($r = 0.14$, $p = 0.001$). Also children with OB watched a higher number of TV hours than non OB children (3.8 ± 1.9 versus 2.6 ± 1.8, $p = 0.02$). According to the level of the mother's education, those with higher education (college) had a higher number of TV sets ($p = 0.0001$) and remembered most of the advertisements broadcasted on TV ($p = 0.007$). However, women with a lower level of education (elementary school or no formal education) watched more hours of TV ($p = 0.01$) a day. In addition, those with the highest income (>$1,000.00 dlls a month) had more TV sets at home ($p = 0.0001$), while those with less income (< 1,000.00 dlls a month) watched more hours of TV ($p=0.006$). The risk of abdominal obesity (Waist circumference > 80 cm) was higher among

mothers who had a TV set in their bedroom (OR = 1.96, 95% CI 1.26-3.05, p = 0.003). Additionally, 78% of mothers watching TV ≥ 2.5 h/day had higher odds of abdominal obesity (OR=1.81, 95% CI 1.17-2.78, p = 0.007), compared with those who watched TV less than 2.0 h/day.

Discussion

This study found that in two Mexican cities with very different human development indexes, including mothers from all socioeconomic status and education levels, an association between the frequency of food advertisements transmitted and the consumption of those foods by mothers and their children; the more the mothers watched TV the more their children do it as well; the higher the income, the higher the TV sets at home, but families with lower incomes watches more TV; and the lower the education level the higher the hours of TV viewing.

In addition, this is one of the few studies that show an association between BMI and the amount of time mothers watch TV. An association between the hours of TV watching and BMI Z-scores by age and sex of the children was also observed.

The above results indicate that in Mexico, TV watching during periods of high audience of soap operas embodies a risk of developing obesity among Mexican mothers and their children, which increase among the people with the lowest income and years of education. These result might also indicate that in countries with lower levels of education the influence of TV advertisements is stronger that in those with better formal education.

In a recent review Hu (2013), stated that findings from well powered prospective cohorts have consistently shown a significant association between sugars sweetened beverage consumption and long term weight gain and diabetes[9]. In addition, two very well designed randomized trials had reported that reducing consumption of sugar sweetened beverages decreases weight gain and adiposity in children and teenagers[10,11]. This is also consistent with two systematic reviews, one of prospective studies[12] and another of randomized clinical studies[13] among older than 13y, showing consisting positive results of the association of sweetened beverages and adiposity.

Consistent with our results are those of Cleland, in Australia, who reported that women watching tv ≥3 hours a day had a higher prevalence of abdominal obesity, and concluded that the association between TV viewing and WC may be partially explained by food and beverage consumption during TV viewing[14].

Dixon et al (2009) reported that heavier TV use and more frequent commercial TV viewing were independently associated with more positive attitudes toward junk food and this was also associated with higher reported junk food consumption[15]. Additionally, Robinson et al also found that food brands had an influence over the preference and like for a food item, given that children demonstrated a preference for foods of specific brands[16].

In Mexico, it was reported that food advertisings of high-energy, dense foods[17] geared toward children were systematically exposed more often than those for adults. Additionally, among very low income and low level of education women living in the Mexico-US border, 67% of the food advertisings were of unhealthy foods, since they had high levels of fat and sugar, and moderate to high levels of sodium[7].

To our knowledge, this is the first study in Mexico that includes mothers of different socioeconomic status, levels of education, and from regions with different human development index, describing: 1) a positive association between the exposure to food advertisements in adult programming by mothers and the TV exposure to their children; 2) an association between the hours of TV watching and BMI Z-scores by age and sex of the children; 3) an association between BMI and mothers' time watching TV; and 4) a further association between TV sets at home and abdominal obesity. This is also the first study conducted in Mexico that explores the effect of TV advertisements during the hours of adult programming, on the weight status of the mothers and their children.

Limitation of this study includes the type of design, this is a cross sectional study; therefore, it could not assess a cause-effect relationship. Besides, the recordings were done on only two national, public broadcasting channels, and other local and national channels were not recorded.

The results suggest that in Mexico, the high exposure to unhealthy foods during TV programs geared to adults and the whole family increases the consumption of these foods by the mothers and their children; further, it increases children's Z-score BMI and mothers' abdominal obesity.

Government, legislators, academics and non-governmental organization should be more involved in preventing curtailing this high risk for obesity environment that the food industry and TV broadcasters are placing upon the Mexican population.

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