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Research report

The salt content of products from popular fast-food chains in Costa Rica ☆

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ABSTRACT

Salt is a major determinant of population blood pressure levels. Salt intake in Costa Rica is above levels required for good health. With an increasing number of Costa Ricans visiting fast food restaurants, it is likely that fast-food is contributing to daily salt intake. Salt content data from seven popular fast food chains in Costa Rica were collected in January 2013. Products were classified into 10 categories. Mean salt content was compared between chains and categories. Statistical analysis was performed using Welch ANOVA and Tukey–Kramer HSD tests. Significant differences were found between companies; Subway products had lowest mean salt content (0.97 g/100 g; $p < 0.05$) while Popeye's and KFC had the highest (1.57 g/100 g; $p < 0.05$). Significant variations in mean salt content were observed between categories. Salads had a mean salt content of 0.45 g/100 g while sauces had 2.16 g/100 g ($p < 0.05$). Wide variation in salt content was also seen within food categories. Salt content in sandwiches ranged from 0.5 to 2.1 g/100 g. The high levels and wide variation in salt content of fast food products in Costa Rica suggest that salt reduction is likely to be technically feasible in many cases. With an increasing number of consumers purchasing fast foods, even small improvements in salt levels could produce important health gains.

Introduction

Many countries around the world are experiencing a nutrition transition, and Costa Rica is no exception. Globally, populations are changing from a diet based on fresh grains, tubers, fruits and vegetables to a diet based on pre-packaged foods which can often be more energy-dense and higher in total fat, saturated fat, cholesterol, sugar, and sodium (Borbón, Robles, & Huesca, 2010; Fernández, Granados, Sandoval, & Acuña, 2010; Johnson et al., 2010; Marchioni, Claro, Levy, & Monteiro, 2011; Monteiro, Levy, Moreira, Rugani de Castro, & Cannon, 2011; Nielsen & Jopkin, 2003; Paeratakul, Ferdinand, Champagne, Ryan, & Bray, 2003). The globalization of food systems has transformed the traditional diet in developing countries like Costa Rica, due to the increasing availability of processed and fast food (Creel, Sharkey, McIntosh, Anding, & Huber, 2008). This situation has contributed to the spread of obesity and non-communicable diseases (hypertension, diabetes, and cardiovascular problems) (Monge, 2001; O'Donnell, Hoerr, Mendoza, & Tsuei Goh, 2008; Rosenheck, 2008; Schmidt et al., 2005), especially among people of lower socioeconomic status, that are also prone to undernutrition (Kearney, 2010).

It is well documented that a high consumption of both energy and dietary sodium are associated with the development of high blood pressure (HBP) or hypertension, a leading risk factor for cardiovascular disease (CVD) (Campbell, Jilliian, & Campbell, 2012; Prentice & Jebb, 2003; World Health Organization, 2007). In Costa Rica CVD is the leading cause of death (33%) in both men and women over 30 years of age. One in three adults in Costa Rica suffers from HBP, a number that has risen more than 10% in the last 15 years (Ministerio de Salud, 2011).

The consumption of sodium from all sources in Costa Rica is higher than the World Health Organization recommendation of 5 g per day (World Health Organization, 2012). It is estimated that the contribution of sodium from table salt is 2.8 g per person per day (equivalent to 7 g of sodium chloride or table salt), and although the exact contribution of sodium from processed and fast foods is not known, it is hypothesized to be higher than what is recommended (Ministerio de Salud, 2011). It is also well documented that in Costa Rica families, teens and young adults are the groups most likely to frequent fast food restaurants, (Euromonitor Internacional, 2011) particularly in an effort to save time and increasingly as a dining option with their families and friends (Monge, 2001; Monge, Aragón, Chinnock, Campos, & Colón, 2013; Monge, Smith, Colón,

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Aragón, & Herrera, 2013). Most of the fast food chains in Costa Rica were initially established in the USA, highlighting the influence of American culture in the eating habits of Costa Ricans (Bermúdez & Tucker, 2003; Kearney, 2010).

A number of transnational companies around the world have committed to reformulating their products toward healthier formulations and creating new ones with better nutritional quality (less sodium, sugar and fat) (Dunford, 2012). Many transnational fast food chains now operate in Costa Rica, however, studies show that salt in fast foods varies substantially between chains and from one country to another (Dunford et al., 2012). To date there has been no research into salt levels in fast foods in Costa Rica, despite research indicating that the contribution of these foods to the diet is higher than recommendations (Ministerio de Salud, 2011). Hence the aim of this study was to examine the reported salt content in products from popular fast food chains in Costa Rica, and to report findings by food category and by fast food chain.

Materials and methods

Data collection

This study comprised a survey of the salt and energy content of fast food menu items from fast food companies in Costa Rica, with data collection done in January 2013. Data were obtained from company websites. The 11 fast food companies most visited by Costa Rican families were identified: Burger King, Domino's Pizza, Kentucky Fried Chicken (KFC), McDonald's, Pizza Hut, Popeye's, Quiznos, Subway, Taco Bell, Teriyaki and Wendy's (Euromonitor International, 2011; Venegas & Villalobos, 2012). Four of these restaurants were excluded from analysis (Burger King, McDonald's, Quiznos and Wendy's) as they did not provide product serving size information and/or nutrition information per 100 g on the company website.

Data for 311 fast food items were collected and entered into a Microsoft Excel spreadsheet. For each product the following information was recorded: company name, product name, serving size (g), energy (kcal and kJ) and salt (g) content. Where information was available, we recorded energy and salt content both per serving and per 100 g. When both measures were not provided, one was calculated from the other using the serving size of the item. If sodium content was provided instead of salt, the value was converted by multiplying by 2.5 (Institute of Medicine, 2004). The data entry process was checked by selecting a random sample of 5% of entries and comparing the information in our database against the original website source.

Definitions of product categories

Ten fast food categories were defined based on those used for previous report from the US (O'Donnell et al., 2008) and Australia (Dunford, 2012) and the product groupings used by the fast food industry: "chicken products" (nuggets, drumsticks, fried, grilles or roasted chicken); "pizza", "potato products" (smashed, fried, boiled with or without condiments); "rice, pasta and noodles", "salads" (all salad items and salads with additional ingredients); "sandwiches" (all kinds, wraps and burritos), "sauces" (all sauces, salad dressings and condiments), "tacos" (including nachos and chalupas), "dessert" (all types) and "others". The overarching goal for the categorization system was that it be applicable to industry and reflect consumer purchasing patterns. Breakfast meals were excluded from this analysis, because not all restaurants offer breakfast menus.

Data analysis

Mean levels (and ranges) for energy and salt content per 100 g were calculated for each food category, overall and for each company. We tested homogeneity of variances (Levene's test, $p < 0.05$) to obtain a single p-value that indicated the presence or absence of variability in energy and salt content across food categories and fast food chains. Due to the variance observed, we used the Welch ANOVA for comparison of means of unequal variances ($p < 0.05$). We used one-way analysis of variance to compare salt content between companies, using Tukey–Kramer test HSD. A p value ≤0.05 was considered statistically significant. All statistical analyses were performed using SPSS version 20.

Results

Only one company, Taco Bell, out of the seven that were analyzed provided regional nutritional information in their websites. The others showed nutritional information from US, Canada or Europe. Salt and energy content data were collected for 311 fast food items from seven companies (Table 1). The number of products per company ranged from 12 (Domino's Pizza) to 75 (Taco Bell). There was a statistically significant correlation ($p < 0.05$) between salt and energy content; with sodium content increasing with an increase in energy content.

Salt content varied significantly between companies ($p < 0.05$) with Subway having the lowest mean level of salt (0.97 g/100 g) and Popeye's having the highest (1.57 g/100 g). There were significant differences ($p < 0.05$) in salt content between Subway 0.97 g and, Pizza Hut 1.52 g, Popeye's 1.57 g and KFC 1.57 g/100 g (Fig. 1).

Figure 2 shows substantial variations in mean salt content were also found between food categories. For example, there was a more than fourfold difference in mean salt content per 100 g between "salads" (0.45 g) and "sauces" (2.16 g). A wide and significant ($p < 0.05$) variation per 100 g was also seen within food categories. For example, salt content in "chicken" ranged from <1 g/100 g to 2.7 g/100 g and "sandwiches, wraps and burritos" ranged from 0.5 g/100 g to 2.1 g/100 g (Fig. 2).

Discussion

The main finding from this study was the marked variability in the reported salt content of products by major fast food chains in Costa Rica. This was true for comparisons between companies, between different products and within food categories. However, the large range of salt content in products from the same food category shows that there is a clear opportunity for reformulation of products toward the lower end of the range by fast food companies to improve the healthiness of their offerings. For example, there was an almost threefold difference in salt content across chicken products and fivefold difference across sauces and condiments. This is in line with research from other countries such as Australia, the US, New Zealand, Canada, France and the UK (Dunford et al., 2012; Johnson et al., 2010), however this study represents the first one of its kind in Latin America (using this methodology) to evaluate

Table 1
Energy (kcal) and salt (g) content (mean and range) per 100 g by company.

Companies	Products (N)	Energy (kcal)		Salt (g)	
		Mean	(SD)	Mean	(SD)
Domino's Pizza	12	265	(49.7)	1.33	(0.40)
KFC	50	236	(118.4)	1.57	(0.84)
Pizza Hut	59	260	(91.6)	1.52	(0.58)
Popeye's	37	206	(127.8)	1.57	(0 77)
Subway	49	213	(160.1)	0.97	(0.60)
Taco Bell	75	132	(89.0)	1.29	(0.36)
Teriyaki	29	225	(64.6)	1.36	(1.33)

Note: SD: Standard deviation. ANOVA test was used for comparisons of mean nutrient content between restaurants. In all cases p values were <0.05.

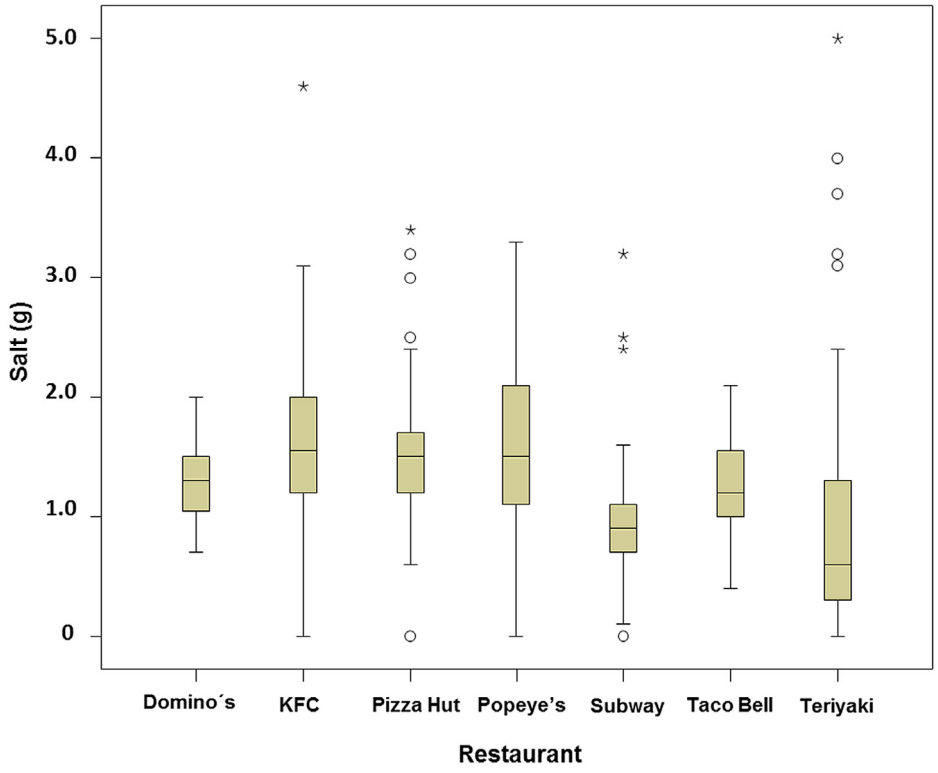

Fig. 1. Mean salt content per 100 g for fast foods by company. Tukey–Kramer (alpha < 0. 05). Lines extending from mean (boxes) indicate the range of values for each company. Circles and stars represent extreme values.

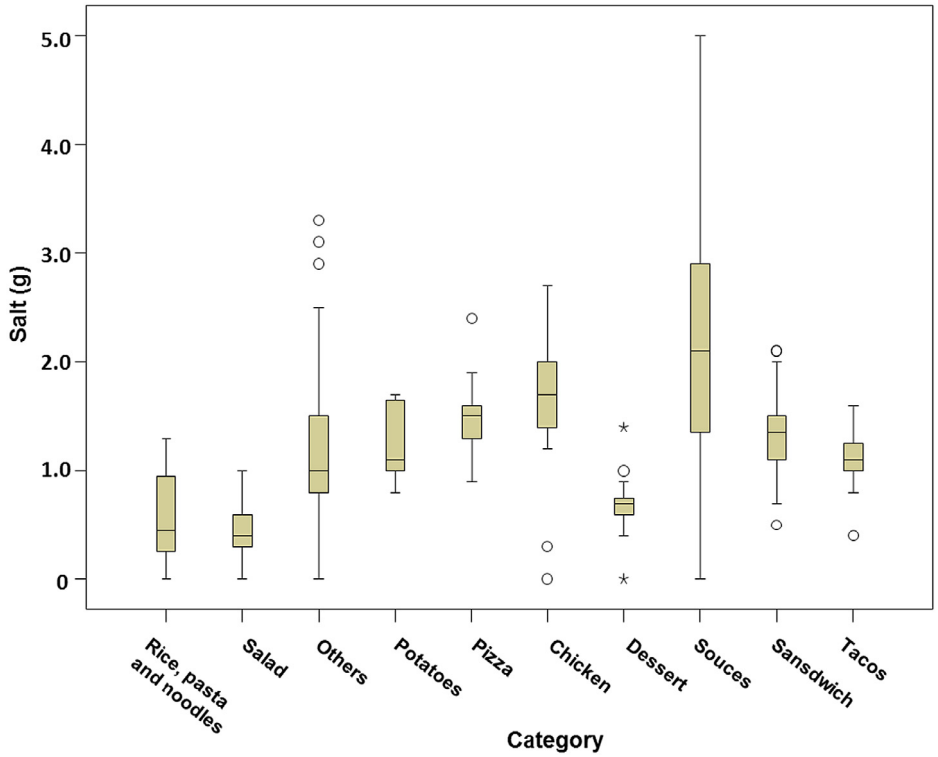

Fig. 2. Mean salt content per 100 g of fast food by food category. ANOVA ($p < 0.05$). Lines extending from mean (boxes) indicate the range of values for each place. Circles and stars represent extreme values.

the salt levels found in products from fast food chains. Our findings are of public health importance as they serve as a baseline that can be used to monitor trends in salt levels over time, as well as provide a starting point to set potential future salt reduction targets for fast food, in line with what other countries have done (Garcia, Dunford, Sundstrom, & Neal, 2014; Jacobson, Havas, & McCarter, 2013). Furthermore, these findings can provide the government in Costa Rica with evidence to put pressure on fast food chains to publish regional nutritional information, as previous research has shown that the nutritional composition of food varies between countries (Dunford et al., 2012; Hobin et al., 2013; Wu & Sturm, 2013) and we observed a number of chains that did not display nutritional information for Costa Rica on their websites.

Countries like the UK, Australia, Finland and Canada are pioneers in the implementation of strategies for salt reduction. Governments in these countries have put pressure on the food industry to reduce sodium levels in foods, such as through mandatory nutritional labeling and the establishment of salt targets in specific food categories (Valenzuela & Atalah, 2011). Because food reformulation can often incur a cost for the industry (Desmond, 2006; Godlee, 1996), it is possible that fast food chains are investing in salt reduction only in products from countries that have well established nutrition-related policies (Dunford et al., 2012).

One of the biggest arguments presented by the industry against reducing levels of salt in their products is consumer acceptability and salt perception of food with reduced sodium content. Studies have shown that for many foods and preparations, the average consumer cannot detect moderate to substantial differences in sodium levels, including reductions of up to as much as 25% (Harvard University & Culinary Institute of America, 2010). Small to moderate reductions in sodium are unlikely to change consumer acceptability (Malherbe, Walsh, & Van der Merwe, 2003). This has allowed many food manufactures and restaurants in countries like Chile, Argentina and México to establish targets of sodium reduction in products that are highly consumed by the population. There is no reason why Costa Rica should not follow in the footsteps of other Latin American countries.

With globalization of the food system occurring around the world, and with low and middle income countries such as Costa Rica experiencing the double burden of under- and over-nutrition (Kearney, 2010), it is important for national governments to establish nutrition-related policies that aim to protect against the increasing burden this can put on the healthcare system. It is likely in the case of Costa Rica that this would include practices such as voluntary salt reduction agreements with the food industry or regulatory aspects to do with nutritional labeling (World Health Organization, 2011).

Limitations

Our study was based on information provided on company websites, and as such we relied on their accuracy. However, analysis from an accredited laboratory would need to be performed to confirm these results. In addition, some fast food chains did not provide information on serving size resulting in analyses per 100 g unable to be done, with other chains only providing information per 100 g resulting in analyses per serving unable to be done. Analysis of sodium content for meal combinations was not included due to the lack of data available.

Conclusions

The high levels and wide variation in salt content of fast food products in Costa Rica indicate that salt reduction would be technically feasible for many products. With an increasing number of consumers purchasing fast foods in Costa Rica, even small reductions in salt levels in these products could produce important health gains.

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