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**The extent and nature of food advertising to children on Spanish television in 2012 using an international food-based coding system and the UK nutrient profiling model.**

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## **ABSTRACT**

**Objective** To examine the extent and nature of food television advertising directed at children in Spain using an international food-based system and the United Kingdom nutrient profile model (UKNPM).

**Study design** Cross-sectional study of advertisements of food and drinks shown on 5 television channels over 7 days in 2012 (8am-midnight).

**Methods** Showing time and duration of each advertisement was recorded. Advertisements were classified as core (nutrient-rich/calorie-low products), noncore, or miscellaneous based on the international system, and either healthy/less healthy, i.e., high in saturated fats, trans-fatty acids, salt, or free sugars (HFSS), according to UKNPM.

**Results** The food industry accounted for 23.7% of the advertisements (4,212 out of 17,722) with 7.5 advertisements per hour of broadcasting. The international food-based coding system classified 60.2% of adverts as non-core, and UKNPM classified 64.0% as HFSS. Up to 31.5% of core, 86.8% of noncore, and 8.3% of miscellaneous advertisements were for HFSS products. The percentage of advertisements for HFSS products was higher during reinforced protected viewing times (69.0%), on weekends (71.1%), on channels of particular appeal to children and teenagers (67.8%), and on broadcasts regulated by the Spanish Code of self-regulation of the advertising of food products directed at children (70.7%).

**Conclusions** Both schemes identified that a majority of foods advertised were unhealthy, although some classification differences between the two systems are important to consider. The food advertising Code is not limiting Spanish children's exposure to advertisements for HFSS products, which were more frequent on Code-regulated broadcasts and during reinforced protected viewing time.

**Keywords:** food advertising, marketing, childhood obesity, nutrient profiling, television.

## Introduction

The prevalence of childhood obesity in Spain, where about one of every three children are overweight,<sup>1</sup> is among the highest in Europe.<sup>2</sup> A highly probable contributing to this statistic is the intensive advertisement campaigns for energy-dense food and drinks and their influence on children's food preferences and caloric intake.<sup>3</sup> Although there are few studies linking directly food advertising and obesity in children,<sup>4,5</sup> there is strong evidence of the association of TV viewing with greater consumption of energy-dense food and obesity.<sup>6,7</sup> One of the main potential mechanisms mediating this relationship is food advertising.<sup>8</sup> Despite new technologies, television (TV) remains the main channel for marketing food and drinks to children.<sup>9</sup>

In 2010, the World Health Organization endorsed the "Set of recommendations on the marketing of foods and non-alcoholic beverages to children" encouraging Member States to: a) collect information on the extent, nature, and effects of food and drink marketing to children; and b) push through policies reducing the impact on children of marketing of foods high in saturated fats, trans-fatty acids, free sugars, or salt (HFSS).<sup>10</sup> Although the majority of the EU countries rely on self-regulatory mechanisms, in Sweden any advertising targeted at children under the age of 12 years is banned and in the UK statutory rules apply to advertisements for HFSS foods on TV channels dedicated to children.<sup>9</sup> In Spain, marketing techniques of TV advertisements of food and drinks (AFD) directed at children under 12 are regulated by the Publicity, Activity, Obesity, and Health Code (PAOS code for its acronym in Spanish).<sup>11</sup> This is a non-statutory code of co-regulation, supervised by the Spanish Food Safety and Nutrition Agency (AESAN for its Spanish acronym), that establishes the ethical principles and standards for the design and dissemination of advertising messages (e.g. avoid exploiting children's credulity or using famous persons popular with them). However, it doesn't regulate the nutritional quality of the advertised products or the broadcasting frequency. Though voluntary in nature, in 2009 the Federation of Radio and TV Organizations of the Spanish Autonomous Regions and the Associated Trade TV Union subscribed to the PAOS Code subjecting all TV food advertising

targeted to children to regulation. Recently, the AESAN, PAOS Code sponsor agency, established a set of indicator measures for the longitudinal evaluation of the extent and nutritional value of AFD.<sup>12</sup>

Research on AFD directed at children in Spain is scarce and presents important limitations.<sup>13–18</sup> Some studies are merely informative in nature with a limited description of methodology and results.<sup>13,16</sup> Others record a small number of days and hours of broadcasting<sup>18</sup> or channels.<sup>15</sup> Finally, of two international studies with Spanish participation, one is a qualitative study<sup>14</sup> and the other is based on a limited number of channels and days of broadcast.<sup>17</sup> Their results showed that most advertised products were highly processed and energy-dense food and drinks, but the majority of the studies didn't analyse the nutritional profile of the products.

The main aim of this study was to perform a comprehensive analysis of the extent and nature of AFD directed at children in Spain using an international food-based system and the United Kingdom nutrient profiling model (UKNPM).<sup>19</sup> This analysis will provide baseline data to compare follow-up data against and evaluate the impact of the PAOS code and other potential future interventions aimed at reducing children exposition to TV food advertising, in accordance with the recommendations of the AESAN and the international network for food and obesity/noncommunicable diseases research, monitoring and action support.<sup>20</sup>

## **Methods**

### **Study design**

This is a cross-sectional study of AFD directed at children (<12 years old, according to PAOS Code) in Spain. The sample consists of 7 days (Monday through Sunday) worth of public broadcasting by 5 popular Terrestrial Digital Television (TDT) channels. Boing, Disney Channel, and Neox channels target child and

adolescent populations (appealing-to-youth) and Antena 3 and Telecinco are the two general interest channels with the highest child audience ratings.<sup>21</sup> Broadcastings were recorded between January and April of 2012, except vacation periods, during a modified child viewing time (6:00-22:00), according to Spanish regulation. This modification excludes the slot between 6:00 and 8:00, with hardly any audience, for the 22:00-24:00 slot where the last daily peak in child audience is usually registered in Spain.<sup>22</sup>

### **Data collection and study variables**

Three research assistants were trained to standardize data collection, and recorded the following information for each advertisement: channel, industry, program type during which the advertisement is broadcasted, day of the week, time of day, and duration of the advertisement. There were three types of advertisements: commercial (standard advertisement), sponsorship (a food company pays for a television program in return for advertising), or telepromotion (advertisements using the settings and characters of a television program). The audiovisual communication law has established the enhanced protection of the following time slots: 8:00-9:00 and 17:00-20:00 (weekdays) and 9:00-12:00 (weekends and national holidays), where programs classified as suitable only for children over the age of 13 years are not permitted.<sup>23</sup>

### *International food-based coding system*

Products in AFD were classified into three categories according to published criteria: core (nutrient-rich/calorie-low products), noncore (HFSS products and/or energy-dense), and miscellaneous.<sup>17,24</sup> If one AFD promoted several products, the most prominent or the first one shown was coded. In AFD of products with different varieties or flavors, the brand's most representative or the most easily identifiable was coded. When all or none of the varieties were shown, we chose the one with the known highest consumption in the population at large; e.g., the semi-skimmed variety for dairy products, the most popular in Spain.<sup>25</sup> Finally, when only the brand's name or logo was shown, the company's most representative product was chosen.

We identified PAOS-regulated AFD according to the type of product advertised, AFD's design, and broadcasting characteristics (channels mainly targeting children under 12, or general interest channels during viewing time slots, programming blocks, or programs with audiences mostly in that age range).

#### *United Kingdom Nutrient Profiling Model (UKNPM)*

Each AFD was examined using the UKNPM, a model that evaluates the nutritional composition of the food/drink advertised by analyzing its healthy (fiber, protein, and vegetables, fruit, and nuts) and less healthy components (calories, sugars, saturated fats, and salt) per 100 g. If the model's algorithm assigns a score below 4 for food, or below 1 for drinks, the product is classified as healthy; otherwise, it is classified as less healthy (i.e., HFSS).<sup>19</sup>

We collected nutritional composition information from the actual product labels. When the product was not found we obtained the information from the company's webpage or by requesting it from the manufacturer. For 24 of the 196 products (12.2%) we referred to Spanish and International food composition databases to complete data for one or more of their components, usually grams of saturated fat, sugars, fiber, or salt, as well as in the case of already reconstituted products, such as pasta.<sup>26-28</sup>

The model was not applicable to AFD for food chain menus (eg., McDonald's Happy Meal) because they included food and drinks, scored differently. In these cases, we chose to include the hamburger as the menu's most representative item. AFD for some food chains, such as KFC and Pan's & Company, were not examined for lack of sufficient nutritional product information available for analysis. However, whenever possible, we found products comparable to the ones advertised. For instance, for Telepizza AFD we used the information from a ham and cheese pizza made by Tarradellas brand.

#### **Analysis**

The following estimates assess the extent and nature of food advertising: percentage of AFD of total advertisements, number of AFD per hour of broadcasting (AFD rate), average AFD duration, proportion of noncore AFD (according to the international system), and proportion of AFD for HFSS products (HFSS AFD, according to UKNPM). The proportion of HFSS AFD was calculated within the subcategories of the variables of interest: type of product, subject to regulation by PAOS Code, and broadcasting characteristics (day of the week, time of day, and channel). We calculated AFD rate according to day of the week and time of day broadcasted. Our main hypothesis was that AFD rate and the proportion of HFSS AFD were lower during reinforced protected viewing times. Hypotheses were tested using the Student t-test for mean comparisons and Pearson Chi-Square to compare proportions. Analyses were performed with Stata v.13<sup>29</sup> and Excel spreadsheet software.

## **Results**

We recorded 17,722 advertisements, with an average of 32.1 advertisements or 9.5 minutes of advertising per hour. Behind the promotion of the channel's own programming, food industry was the most advertised product category, which accounted for 4,212 (23.7%) advertisements with an average duration of 15.9 seconds per AFD, and an average of 7.5 AFD per hour of broadcasting. Contrary to our hypothesis, AFD rate was greater during reinforced protected viewing times (protected time) (8.5 vs. 7.2), although the difference didn't reach statistical significance ( $p=0.16$ ). Other frequently advertised categories were personal care and pharmacy, and home and fashion, with 12% and 7.9% of advertisements respectively.

Telecinco broadcasted 29.1% of AFD versus Disney (12.8%) and Boeing (9.0%) lower percentages. The most common AFD format was the commercial (96.2%). Of all AFD, 61.3% was subject to PAOS regulation, 26.6% were broadcasted during protected time, and 67.6% were for foods (Table 1).



Figure 1 shows that 60.2% of AFD promoted noncore products, 31.5% promoted core products, and 8.3% promoted miscellaneous products. The proportion of AFD for noncore products was 62.4% in appealing-to-youth channels vs. 58.4% in general interest channels ( $p < 0.01$ ; data not shown in the figure). The vast majority (86.8%) of noncore AFD, 22.6% of core AFD, and 25% of miscellaneous AFD were promoting HFSS products according to UKNPM (figure 1). Figure 2 shows that that dairy products were the most advertised both in their low-fat (18.3%) and whole version (10.2%), followed by bakery/pastry products (13%), chocolates/confectionery (8.5%) and fast food (7%). Breakfast cereals accounted for 156 AFD (3.7%), being 72.4% of them for high sugar/low fiber versions. In the core product section, AFD for all high-fiber breakfast cereals, 69% of children meals, and 28.1% of low-fat dairy products were HFSS according to UKNPM. Of the noncore products, 20.4% of the chocolate/confectionery AFD and 17.7% of the AFD promoting spreads, oils, sauces, and soups were scored as healthy. Overall, 64% of the 4,025 AFD scored by UKNPM were classified as HFSS (data not showed in the figure).

Table 2 shows that the percentage of HFSS AFD was, in absolute terms, 6.8% greater during protected time vs. other times, 10.4% on weekends vs. weekdays, 7.2% on appealing-to-youth channels vs. other, 31% for food vs. drink products, and 18% in PAOS-regulated scenarios vs. other; all the differences being statistically significant ( $p < 0.01$ ).

## **Discussion**

In Spain, almost one of every four TV advertisements are for food products, averaging 7.5 AFD per hour of broadcasting. Based on studies on audience ratings<sup>22,30</sup> we estimated that Spanish children between the ages of 4 and 12 are exposed to a daily average of 18.8 AFD and over 25 AFD for 7 to 12 year-olds. Close to two thirds are for HFSS products. However, we found a high level of disagreement between the two classification methods, as over one fifth of core AFD were HFSS according to UKNPM. The percentage of HFSS AFD was

greater during protected time and weekends, exactly when the AFD rate is higher and children spend more time watching TV. The percentage of HFSS AFD was also higher in appealing-to-youth channels and in those regulated by the PAOS Code.

Spain is among the countries with the highest AFD rates (12) and comparable to Greece,<sup>31</sup> the Mediterranean country with the highest prevalence of overweight children.<sup>2</sup> In the U.S., with obesity rates similar to Spain's, AFD rates are somewhat lower (6 AFD/h).<sup>24</sup> However, since close to 90% of the AFD in the U.S. were for HFSS products,<sup>32</sup> child exposures to HFSS AFD were comparable. In Australia, both the rates of overweight children and of AFD were lower than Spain's.<sup>33</sup> Previous studies have found an ecological association between AFD and child obesity in the U.S., Australia, and several European countries;<sup>4</sup> and a longitudinal relationship between BMI in children under 13 and time spent watching advertisements.<sup>5</sup> This evidence linking indicators of exposure to food advertising and childhood obesity is scarce and limited by the design of the studies, but even short-term exposure to food advertising results in children increasing their energy intake.<sup>34</sup> In addition, there is strong evidence of the association of TV viewing with children obesity independent of physical activity.<sup>7,35</sup> Furthermore, a number of clinical trials with interventions limiting children's TV time have shown a significant reduction in obesity risk mediated by lower caloric consumption.<sup>36-38</sup> Taking in consideration all the current evidence, the Commission of the World Health Organization on ending childhood obesity has concluded that there is unequivocal evidence that the marketing of unhealthy foods and sugar-sweetened beverages is related to childhood obesity.<sup>39</sup> Using mathematical simulation models, it has been estimated that AFD may explain up to one third of child obesity cases in certain countries.<sup>40,41</sup> A 2012 study<sup>42</sup> in six Asia-Pacific region countries showed that the exposure of children to HFSS AFD was greater than that estimated based on our data, which may contribute to a progressive upward convergence of obesity rates worldwide.<sup>2</sup>

In our study, the noncore AFD frequency was similar to that in Australia and U.K.,<sup>43,44</sup> but lower than that in the U.S., Canada, and Germany.<sup>17,45</sup> However, the percentage of HFSS AFD (64%) in our study was higher than that reported for the U.K. (51.7%) and similar to that reported for Canada (65.7%).<sup>46</sup> These contradictions

exist because the food-based system allows the classification of all low-fat dairy products as core products, a third of which are HFSS due to their high sugar content. In contrast, the only healthy breakfast cereal brand failed to achieve the fiber level necessary to be classified as a core product. Further, whereas in the US and Canada fast-food promotional messages make up as much as one third of AFD,<sup>17</sup> in Spain ads for low-fat dairy products take the lead with an 18.3% of the total share. These and other minor (quantitatively speaking) inconsistencies hinder cross-country comparisons using the international food-based coding system. These difficulties would be solved by using common nutrient profiling systems.<sup>47</sup>

Over 70% of PAOS Code-regulated AFD promoted HFSS products, over 20 points above the rest of AFD. The percentage of HFSS AFD was higher during protected time and in appealing-to-youth channels, consistent with international reports.<sup>17,31,44,45,48</sup> The percentage of core AFD was also higher in appealing-to-youth channels, although the observed difference was lower than that in the U.K. study.<sup>44</sup> Compared to data from two 2008 Spanish studies,<sup>17,18</sup> the AFD rate has increased from 6.0 to 7.5 and the percentage of HFSS AFD has grown from 60.0% to 64.0%. The 2009 adherence to the PAOS Code by television channels seems to have increased Spanish children's exposure to HFSS AFD, although we need to be cautious due to differences in channels and days/time slots recorded across studies. This is the result of the PAOS Code being flawed from the onset because it fails to regulate the nutritional composition of the advertised products, and does not apply to time slots with substantial child audience if they aren't the main audience. Similarly in the U.K., children exposure to HFSS AFD has remained stable despite channels' high adherence to the existing restrictions due to increasing frequency of AFD in unregulated programs and time slots.<sup>49</sup> Thus, regulating advertisement through nutritional profiling, although essential, it is not enough to reduce children's exposure to HFSS AFD. A wider definition of advertising directed at children (age range and broadcasting times) is necessary. Further, the definition should also refer to audiences in absolute terms (not relative as it does now) when regulating in general interest programming but with a substantial youth audience.<sup>50</sup> Some programs with the highest child audience are not subject to PAOS regulation due to being of general interest

or broadcasted during prime-time.<sup>30</sup> Finally, the PAOS Code only protects those under 12 years of age, although 40% of 12 year-olds are still not aware of the persuasive intent of advertising.<sup>51</sup>

These findings should be interpreted in the context of the study's limitations. First, the limitations of the classification systems mentioned above. Second, issues such as olive oil, a staple of the Mediterranean diet with heart-healthy properties,<sup>52</sup> was classified as noncore together with other oils lacking such properties. Further, olive oil was categorized as a HFSS product due to its high calorie count and saturated fat content since the UKNPM evaluates 100g of product, an amount far greater than what is regularly consumed. Moreover, the UKNPM does not take into account the monounsaturated fats and other bioactive components, e.g., polyphenols, with healthy properties.<sup>53,54</sup> Third, by limiting the recording period to the months of January through April we may have missed out some seasonal variations in advertising that could occur later in the year.<sup>44</sup> Four, being a single country study, we should be cautious with the generalisation to the broader community. Finally, given the lack of parallel data regarding children TV viewing and food consumption, we couldn't obtain direct estimates of children exposition to food advertising in Spain.

## **Conclusions**

This study provides basic data on AFD frequency and nutritional profiling which will allow to monitor trends of TV advertising directed at children in Spain and evaluate the impact of the regulatory systems. Using common nutrient profiling systems such as UKNPM, instead of, or in addition to, the international food-based coding system, facilitates international comparisons.

Our findings show that the PAOS Code, in spite of TV channels' adherence, not only is failing to reduce Spanish children's exposure to HFSS AFD, but it may be having the opposite effect, as the AFD rate and the percentage of HFSS AFD have increased in comparison with data from a similar study in 2008, both figures being higher during reinforced protected viewing time. Meeting that objective requires the establishment of

a regulatory system, based on a nutritional profiling model, to block HFSS AFD to children under 16. This ban should also apply to programs with large children audiences even if broadcasted in general interest channels. This would require implementing a 22:00 watershed for HFSS AFD on television and eliminate the “pull effect” created by the late night broadcasting of programs attractive to minors.

#### **Author Statements**

#### **Ethical approval**

Ethical approval was not required because the design (cross sectional study of television advertisements) did not need Ethical Committee supervision in the institution.

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#### **Competing interests**

The authors have no conflict of interest to declare.

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