

Original

Adherence to nutritional recommendations in vending machines at secondary schools in Madrid (Spain), 2014-2015

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ABSTRACT

Objective: To describe the nutritional content of products offered in food and drink vending machines at secondary schools in the Madrid Autonomous Community (Spain), and to evaluate these items' adherence to the nutritional recommendations of the National Health System Consensus Document on School Food. **Methods:** Cross-sectional study of a sample of 330 secondary schools in Madrid across the period 2014-2015. Secondary school vending machines were identified by telephone interview. The products offered in a representative sample of six machines were identified by inspection *in situ*, and their nutritional composition was obtained from the labelling.

Results: A total of 94.5% of the 55 products on offer failed to comply with at least one nutritional criterion of the Consensus Document on School Food. The recommendation relating to sugar content registered the highest level of non-compliance, with 52.7% of products, followed by the recommendations relating to energy (47.3%) and fats (45.5%). The mean number of unmet criteria was 2.2, with this figure being higher in foods than in drinks (2.8 versus 1; $p < 0.01$).

Conclusion: Almost all the products on display in secondary school vending machines in Madrid were in breach of the Consensus Document on School Food, mainly due to an excess of calories, sugars and fats. Compulsory nutritional criteria and a procedure for monitoring adherence should be established, specifying those responsible for performing this task and the corrective measures to be applied in the event of non-compliance.

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Adherencia a las recomendaciones nutricionales en máquinas expendedoras en centros de enseñanza secundaria de Madrid (España), 2014-2015

RESUMEN

Objetivo: Describir el contenido nutricional de los productos ofertados en las máquinas expendedoras de alimentos y bebidas de los centros de educación secundaria de la Comunidad de Madrid (España), y evaluar su adherencia a las recomendaciones nutricionales del Documento de Consenso del Sistema Nacional de Salud sobre la Alimentación en los Centros Educativos.

Métodos: Estudio transversal sobre una muestra de 330 centros de educación secundaria de la Comunidad de Madrid durante 2014-2015. Las máquinas expendedoras se identificaron mediante entrevista telefónica. Los productos ofertados en una muestra representativa de seis máquinas se identificaron mediante inspección *in situ*, y su composición nutricional se obtuvo del etiquetado.

Resultados: El 94,5% de los 55 productos ofertados incumplía al menos uno de los criterios nutricionales del documento de consenso. La recomendación relativa al contenido de azúcares presentó el mayor grado de incumplimiento, con un 52,7% de los productos, seguida de las relativas a la energía (47,3%) y las grasas (45,5%). La media de criterios incumplidos fue de 2,2, siendo superior en los alimentos que en las bebidas (2,8 frente a 1; $p < 0,01$).

Conclusión: Casi todos los productos de las máquinas expendedoras de los centros de educación secundaria de la Comunidad de Madrid incumplen el Documento de Consenso, principalmente por exceso de calorías, azúcares y grasas. Se recomienda establecer criterios nutricionales de obligado cumplimiento y un procedimiento para monitorizar la adherencia a los mismos, con identificación de sus responsables y previsión de medidas correctoras en caso de incumplimiento.

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Introduction

The prevalence of overweight and childhood obesity in Spain is one of the highest in Europe (26% and 12.2% respectively),¹ along with Greece, Portugal, Italy, Malta, the United Kingdom and Ireland.^{2,3} According to the Spanish National Health Survey, the Autonomous City of Ceuta registers the highest prevalence of childhood obesity in Spain, with 24.7%, and the Autonomous Community of Aragon the lowest, with 2.7%, versus 10.6% in Madrid.⁴ Childhood obesity increases the risk of arterial hypertension, dyslipidaemia, diabetes and locomotor disorders, and of exacerbation of respiratory diseases such as asthma, and psychosocial disorders such as discrimination and low self-esteem.⁵

The causes of global childhood obesity are low physical activity, sedentarism and inappropriate diet, coupled with a high consumption of high-calorie, processed foods rich in sugars and saturated fats and poor in micronutrients, promoted by an unfavourable socio-economic environment.^{6,7} Spanish children consume processed products in excess, whereas the consumption of fruit, vegetables and legumes is inadequate.^{8,9} Furthermore, they have a deficit of fibre and complex carbohydrates and an excess of fats and sugars, accounting for 45.9% and 21.2% of total calorie intake respectively, far above the recommended values.¹⁰ Soft drinks, fruit juices and fruit drinks contribute from 5% to 6% total calorie intake of Spanish children and adolescents,¹¹ corresponding to a mean consumption of around 200 ml/day.¹² Data from the Spanish National Health Survey shows that 17% of Spanish children aged 5 to 14 years consumed sugar-sweetened soft drinks daily in 2006, a figure that fell to 11% in 2011, after the 2008 economic crisis¹³. When looking at those children in the same age range belonging to the low socio-economic class, the figures for daily consumption of sugar-sweetened soft drinks were over 30% in 2006 and 17% in 2011.

Childhood is a crucial period for preventing overweight and obesity, since it is then that dietary habits are formed which will endure into adult ages. Hence, the special emphasis laid on the childhood population by the Strategy for Nutrition, Physical Activity and Prevention of Obesity (*Estrategia para la Nutrición, Actividad Física, Prevención de la Obesidad y Salud/NAOS*) and the choice of a school setting as one of the priority areas for intervention.¹⁴ One of the first initiatives was the 2005 Collaboration Agreement with the Spanish National Association of Automatic Vending Distributors (*Asociación Nacional Española de Distribuidores Automáticos*), aimed at impeding the access of primary-school pupils to food and drink vending machines, and improving the nutritional quality of the items on offer, including those that would contribute to a balanced diet at the expense of others with a high salt, sugar or fat content. In 2008, a study of Madrid primary schools reported negligible compliance with the agreement.¹⁵ In 2010, the National Health System Interterritorial Council (NHSIC) approved the Consensus Document on School Food (*Documento de Consenso del Sistema Nacional de Salud sobre Alimentación en los Centros Educativos*),¹⁶ which laid down school-canteen food guidelines and the nutritional criteria to be met by food and drinks offered in school cafeteria and vending machines.

Many studies have assessed adherence to the schools' meals recommendations by school canteens,¹⁷⁻²⁰ but in a literature review we found no previous research focused on the products sold in food and drink vending machines in Spain. Accordingly, this study describes the nutritional content of products found in vending machines at secondary schools (*Centros de Educación Secundaria*) in the Madrid Autonomous Community, and evaluates their adherence to the Consensus Document on School Food recommendations.

Methods

Study design

We conducted a cross-sectional study whose target population were secondary schools in the Madrid Autonomous Community during the 2013-2014 academic year. The list of schools was obtained from the Madrid Autonomous Community Internet Schools Portal.²² In December 2013, a letter was sent to all the 801 secondary schools of Madrid encouraging them to participate in case of being selected. In January 2014, 511 secondary schools were selected by simple random sampling and contacted by telephone to seek their participation. Where a school failed to reply, the telephone invitation was repeated and the school sent the e-mail questionnaire. The non-response rate was 35.4% and the final sample comprised 330 secondary schools. The main reasons for non-participation were lack of interest in the study or lack of time and availability. Further information about the study design and sample size calculation is reported elsewhere.^{17,21}

Of the 330 secondary schools, 57 (17.3%) had one or more vending machines, making a total of 93 such machines, with 23 (24.7%) selling food, 55 (59.2%) selling drink, and 15 (16.1%) selling a mixed range of items. In view of the similarity in the products sold by vending machines of the same type,¹⁵ which depends on the products available in the market at any particular time point, we decided to include the minimum number of machines possible in this study, while maintaining the distribution by type of machine (food, drink, and mixed) similar to that of the original sample. We thus obtained a subsample of six machines, made up of one with a mixed range (16.7%), due to this being the least frequent in the original sample, two with food (33.3%), and three with drink (50%). The machines were selected from schools of every ownership type, i.e., two from private, two from public and two from subsidised schools. The sample made up of the different foods and drinks drawn from the six machines forming the subject of this study totalled 55 items.

Collection of data and study variables

From January to May 2015, the schools housing the six selected vending machines were visited after making an appointment with the respective head teachers. All the products in the machines were identified and photographed. Information on ingredients, calorie content and nutritional composition per 100 g (foods) or 100 ml (drinks) was obtained from product labels, as in the example in [Figure 1](#). The calorie content and nutritional composition per portion was obtained by simple calculations with the portion size reported in the food packages. Where the nutritional information of any item was not visible and was not available on the company's web page, a sample item was taken from the vending machine.

The Consensus Document on School Food lays down the nutritional criteria for food and drink sold in vending machines ([Table 1](#)). The maximum value of 200 Kcal per portion was estimated as the 10% of the mean daily total calorie intake recommended for children aged 3 to 18 years (2000 Kcal); this was considered appropriate for a morning or afternoon snack. In addition, products may contain no artificial sweeteners, caffeine or other stimulants, or trans-fatty acids, other than those naturally present in dairy and meat products (≤ 0.5 g per ration). [Table 1](#) also shows the equivalence of the nutritional criteria in g per portion and per 100 g of food or 100 ml of drink.¹⁶

The products offered in the vending machines were classified as foods and beverages, according to the criteria in previous research on this topic.²³ Like in a similar study in secondary schools in Ontario (Canada),²⁴ we included water in our analysis.

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