

**BRIEF ORIGINAL****LIFESTYLE HABITS AND PARENTING STYLES RELATED TO CHILDHOOD OBESITY. A COMPARISON OF SPANISH AND NORTHERN EUROPEAN POPULATIONS: THE ENERGY PROJECT.**

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**ABSTRACT**

**Background:** The prevalence of childhood obesity is higher in Spain than in Northern European countries for reasons that are still unknown. The objective was to determine whether variables related to lifestyle habits and styles of parental care related to obesity in children differ between the countries of Northern Europe and Spain.

**Methods:** Data were obtained from the ENERGY international project using questionnaires. We analyzed data from Spain, the Netherlands, Belgium and Norway including 1937 boys and 2061 girls aged 10-12 years old. We have studied the behavior of parents related to dietary variables, variables related to physical activity and ways of care. We calculated the mean and the proportions of all the variables and then calculated the association between different variables with the country of origin using the beta coefficient and the odds ratio (OR) as a measure of association.

**Results:** Compared with parents in Northern Europe, Spanish parents consume significantly less days a week sugary drinks (Mean: 1.37 vs 2.16) but they consume more fruit juices (Mean: 2.61 vs 2.35). Spanish parents are more active going to their work, they are less sedentary but perform physical activity in their leisure time fewer days per week (Mean days per week they do physical activity in their leisure time: 1.88 vs 2.21). In addition, they are less negotiators with their children (Mean (0-4): 1.26 vs 1.68) and prevent less negative role models (Mean (0-4): 0.90 vs 1.29). However, they pay more attention (Mean (0-4): 3.42 vs 3.04) and encourage more healthy habits (Mean (0-4): 2.38 vs 2.06).

**Conclusions:** The variables related to lifestyle habits and styles of care related to childhood obesity differ between Spanish parents and those of the countries of Northern Europe but these differences are not statistically significant. Therefore, differences in lifestyles and parenting practices might not explain the significant differences in childhood obesity between the Northern countries and Spain.

**Keywords:** Obesity. Life Style. Care pattern. Parents.

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**DOI:****RESUMEN****Hábitos de vida y estilos de cuidado de los progenitores relacionados con la obesidad infantil. comparación de una población española con poblaciones de países del norte de europa: Energy-Project**

**Fundamentos:** La prevalencia de obesidad infantil es más alta en España que en los países del norte de Europa por razones que todavía se desconocen. El objetivo fue comprobar si variables referentes a hábitos de vida y a estilos de cuidado de los progenitores relacionados con la obesidad infantil difieren entre los países del Norte de Europa y España.

**Métodos:** Los datos fueron obtenidos del proyecto internacional ENERGY. Se analizaron los de España, Países Bajos, Bélgica y Noruega, incluyendo a 1.937 niños y 2.061 niñas de 10 a 12 años de edad. Se estudiaron los comportamientos de los padres referidos a variables dietéticas, variables relacionadas con la actividad física y los estilos de cuidado. Se calcularon las medias y las proporciones de todas las variables y a continuación se calculó la asociación de las diferentes variables con el país de origen utilizando el coeficiente beta y la Odds Ratio (OR) como medidas de asociación.

**Resultados:** En comparación con los progenitores del Norte de Europa, los progenitores españoles consumen bebidas azucaradas menos días por semana (Media: 1,37 vs 2,16) pero consumen más zumos de frutas (Media: 2,61 vs 2,35). Los progenitores españoles son más activosiendo a su trabajo, son menos sedentarios pero realizan actividad física en su tiempo libre menos días por semana (Media de días por semana que realizan actividad física en su tiempo libre: 1,88 vs 2,21). Además, son menos negociadores con sus hijos (Media (0-4): 1,26 vs 1,68) y evitan menos los modelos negativos de conducta (Media (0-4): 0,90 vs 1,29). Sin embargo, prestan más atención (Media (0-4): 3,42 vs 3,04) y estimulan más los hábitos saludables (Media (0-4): 2,38 vs 2,06).

**Conclusiones:** Las variables referentes a hábitos de vida y a estilos de cuidado relacionados con la obesidad infantil difieren entre los progenitores españoles y los de los países del Norte de Europa aunque estas diferencias no son estadísticamente significativas. Por lo tanto, las diferencias en los estilos de vida y estilos de cuidado de los progenitores probablemente no expliquen las diferencias en la obesidad infantil entre los países del Norte y España.

**Palabras clave:** Obesidad. Estilos de vida. Estilos de cuidado. Progenitores

## INTRODUCTION

Obesity is a severe public health problem with negative consequences for physical, mental and social health,<sup>1</sup> and its prevalence has been rising at an alarming pace among children and adults in the last two decades.<sup>2</sup> In recent years, scores of papers have been published seeking to explain the growing problem of childhood obesity. Some researchers have developed models inspired by Bronfenbrenner's Ecological Model.<sup>3,4</sup> The ecological model holds that human beings do not develop in isolation but are instead influenced by their families, homes, schools, the community and society in general, and that each of these settings generates interactions with the others, which ultimately go to develop the individual.

In Europe, childhood obesity is known to display a north-south pattern, with higher prevalences in Southern European countries.<sup>5</sup> According to data from the ENERGY Project,<sup>6</sup> while Belgium (15.1%), The Netherlands (16.1%) and Norway (14.4%) register the lowest prevalences, Spain registers one of the highest (24.8%). It is unlikely that genetic factors could account for these differences, in view of the fact that this same north-south gradient can even be seen within the same country, as in the case of Spain.<sup>7</sup> Other factors that are susceptible to change, such as socio-economic or environmental factors, may be responsible.

Socio-economic level may be a relevant factor, possibly mediated by income-related dietary factors, such as mother's nutrition during pregnancy or bottle-feeding in infancy,<sup>8</sup> among others. Studies on the links between childhood obesity and socio-economic status (SES) suggest that excess weight in children is more frequent among the highest-income families in the least industrialised societies, especially among those who move to urban areas, than among the lowest-income families with a lower educational level in the most industrialised societies.<sup>9</sup>

Another of the determining factors is the so-called "obesogenic" environment.<sup>10</sup> This covers a series of physical and social elements which shape the structure of a community and can have an influence on obesity through the creation of a climate that promotes an increase in energy consumption and a reduction in energy expenditure. The many ways in which the environment influences health encompass, not only the direct impact of various chemical, physical and biological agents, but also a wider spectrum of factors linked to the physical environment, including the home, urban development, land use, transport, type of work and social environment, which in turn includes social norms and cultural values. In the case of children, factors such as schools and play grounds would also be included.<sup>11</sup> Accordingly, factors such as access to safe play areas, access to and cost of food, and differences in residential area, educational level, transport and/or agricultural policies may well be important factors when it comes to explaining the difference observed in the prevalence of obesity between northern and southern Europe.

Last, but by no means least, is the fact that cultural factors, including those relating to parents, cannot be ruled out. In this regard, the influence that parents have on the development of a child can be of extreme importance, even in the case of childhood obesity. It has however been shown that the specific mechanism of this influence is difficult to isolate.<sup>12</sup> Apart from genetics, parents also mould their children's environment and health-related behaviours through their own behaviour and parenting styles.<sup>13</sup>

To draw up effective childhood-obesity prevention programmes, it is important to bear in mind and understand both the parent-child relationship and the impact of parenting styles and/or health-related lifestyles on childhood overweight and obesity.<sup>14</sup> Different groups of experts and committees, along with other researchers, have highlighted the importance of the family per se and of various

levels of influences within the family system, which interfere in the development of children and adolescents.<sup>15</sup>

Accordingly, we selected family-related variables, specifically health-related lifestyles and parenting-styles, due to the fact that both these types of variables are related to childhood obesity, as has been shown by a number of studies.<sup>16-18</sup>

The aim of this study was thus to ascertain whether lifestyle (nutrition and physical activity) and parenting-style variables linked to childhood obesity, differed between Northern European countries and Spain.

## MATERIAL AND METHODS

The data were obtained from the ENERGY project,<sup>19</sup> an international project under which a cross-sectional school survey was conducted in seven European countries (Belgium, Greece, Hungary, The Netherlands, Norway, Slovenia and Spain).<sup>20</sup> Items validated in other relevant European questionnaires were used in the questionnaires.<sup>21</sup>

Among other assessments, we included anthropometric measures, a child questionnaire, a questionnaire for parents, and a questionnaire to be completed by school staff. This was all designed to measure health-related behaviours, and individual and environmental factors that can influence such behaviours.

A detailed description of the project's design and conceptual framework plus the survey procedures and methodology used is given in another paper.<sup>21</sup> Some of the main results of this project have been previously published.<sup>6,22</sup>

**Participants.** A cross-sectional study was undertaken at schools in seven European countries from March to July 2010, targeting children aged 10 to 12 years. For the purposes of this study, data from Spain, Belgium, The Netherlands and Norway were analysed. Based on a previous study,<sup>23</sup> we decided that

a sample of 1,000 children per country and one parent per child (main caregiver) was required. The sample was representative at a national level in The Netherlands, but in the other three countries schools were selected as follows: in Spain from the Aragon Autonomous Region; in Belgium from Flanders (the Dutch-speaking north of the country); and in Norway from regions in the south of the country.

## Variables

### Health-related behaviours

**Dietary variables of parents.** The following variables were used: intake of sugary drinks; consumption of fruit juice; and having breakfast. This information was obtained by a question in the questionnaire which recorded the weekly consumption of these items. Answers ranged from "never" to "more than once a day, every day". The mean consumption of each of the variables was expressed in days per week. In addition, we calculated the percentage of parents who reported never drinking sugary drinks, who consumed fruit juice less than once a week, and who had breakfast every day.

**Variables linked to parents' physical activity.** We used a variable relating to active transport to the workplace, by calculating the days per week on which parents went to work on foot or by bicycle. To this end, the questions that sought to ascertain the number of days on which parents went to work on foot or by bicycle by referring separately to weekdays and weekends, were pooled, with answers ranging from "never" to "5 days per week". Similarly, we also calculated the days per week on which parents engaged in leisure-time physical activity. In this case, the answers referring to "weekdays" and "weekends" were pooled; and once again, these ranged from "never" to "5 days per week". Insofar as variables of sedentarism were concerned, we calculated the number of hours per day that parents spent watching television, or using the computer or mobile telephone. For this

purpose, we firstly pooled the questions referring to weekdays and weekends in relation to each of the study variables: the answers relating to TV, computer and mobile telephone use were then likewise pooled.

In addition, we calculated the percentage of parents who went to work on foot or by bicycle more than 2 days per week, who engaged in physical activity more than three days per week, and who spent less than 3 hours per day using the TV, computer or mobile telephone.

**Parenting practices.** We studied variables relating to monitoring, permissiveness, negotiation, encouragement of healthy lifestyles, self-efficacy for handling children, and restriction of negative models. Each of the practices studied included questions addressing the intake of sugary drinks, consumption of fruit juice, having breakfast, engaging in physical activity and watching TV. In the case of monitoring, the questionnaire contained statements of the type, "I pay attention to the amount of sugary drinks that my child drinks". Another example, in this case relating to negotiation, was the statement, "I negotiate with my child about the amount of sugary drinks he/she is allowed to consume". Answers were scored from 0 (never) to 4 (always). We firstly calculated the mean for each question, and then pooled the questions referring to each practice and calculated the mean.

We also calculated the percentage of parents who reported always being attentive, who were never or almost never permissive, who frequently negotiated and encouraged healthy lifestyles, who had a high degree of self-efficacy for handling children, and who always avoided health-related models.

**Confounding variables.** Analyses were adjusted for children's sex, age and Body Mass Index (BMI) and parents' socio-economic status based on educational level, as shown by a coded variable in the questionnaire, which measured whether at least one of the

parents had attended school for more than 14 years.<sup>25</sup>

Statistical analysis. We first calculated the means, standard deviations, proportions and standard errors for all variables included in the study. Sex-related differences were tested using the Student's t-test for continuous variables and the Chi-squared test for categorical variables.

The association between country of origin and the respective parent-related variables was then computed. The measures of association used were: the beta coefficient, calculated using linear regression where the variables were analysed quantitatively; and the OR, calculated by logistic regression, where the variables were measured using a binary approach. The level of significance used was  $p<0.05$ . All statistical analyses were performed using the SPSS statistics software programme version 20.

## RESULTS

**Table 1** shows the mean of each of the study variables for Northern European countries and Spain, and the association between country of origin and the different variables analysed in the form of continuous variables. Whereas Northern European parents consumed sugary drinks on more days per week than did those from Spain (mean: 2.2 days in Northern Europe vs. 1.4 in Spain), Spanish parents consumed fruit juice a mean of 2.6 days per week vs. 2.3 days for Northern European parents, with the difference being statistically significant in both cases. When it came to breakfast, no differences were in evidence. Spanish parents were observed to be more active going to work, with the mean number of days on which they went on foot or by bicycle being 1.6 vs. 1.2 for Northern European parents. Nevertheless, Spanish parents engaged in sports on fewer days per week than did Northern European parents (1.9 in Spain vs. 2.2 in Northern Europe). On the other hand, parents from Northern Europe were more sedentary than those from Spain, i.e., 6.1 vs. 5.6

**Table 1**  
**Descriptive statistics (means) of parent-related variables, and association between countries and such variables**

		NETH/BEL/NOR % (SE)	SPAIN % (SE)	p	OR (95% CI) <sup>a,b</sup>
Dietary behaviour	Consumption of sugary drinks (days/week)	2.16 (2.47)	1.37 (1.83)	<0.001	-0.750 (-0.940;-0.562)
	Consumption of fruit juice (days/week)	2.35 (2.45)	2.61 (2.55)	0.009	0.260 (0.050;0.470)
	Breakfast (days/week)	6.40 (1.60)	6.51 (1.39)	0.082	0.076 (-0.049;0.202)
Physical-activity-related behaviour	Active transport to work (days/week)	1.18 (1.83)	1.64 (2.19)	<0.001	0.433 (0.266;0.600)
	Participation in sports (days/week)	2.21 (1.90)	1.88 (2.02)	<0.001	-0.236 (-0.403;-0.070)
Sedentary behaviour	Time devoted to TV/computer/mobile-telephone use (hours/day)	6.13 (3.01)	5.59 (2.68)	<0.001	-0.375 (-0.620;-0.129)
Parenting practices	Paying attention/monitoring (0-4)	3.04 (0.64)	3.42 (0.57)	<0.001	0.360 (0.309-0.412)
	Permissiveness (permissive style) (0-4)	1.13 (0.43)	1.13 (0.39)	0.865	0.022 (-0.012;0.056)
	Negotiation (authoritative style) (0-4)	1.68 (0.84)	1.26 (0.91)	<0.001	-0.488 (-0.559;-0.416)
	Encouragement of healthy lifestyles (0-4)	2.06 (0.55)	2.38 (0.61)	<0.001	0.269 (0.223-0.316)
	Self-efficacy of parents for handling children (0-4)	0.65 (0.52)	0.60 (0.54)	0.042	-0.054 (-0.098;-0.011)
	Avoidance of negative models (restriction) (0-4)	1.29 (0.91)	0.90 (0.78)	<0.001	-0.412 (-0.483;-0.340)

NETH: The Netherlands, BEL: Belgium, NOR: Norway, SE : Standard error. <sup>a</sup>Results adjusted for sex, age, SES and BMI. <sup>b</sup>Country of reference: Spain

**Table 2**  
**Descriptive statistics (%) of parent-related variables, and association between countries and such variables**

		NETH/BEL/NOR % (SE)	SPAIN % (SE)	p	OR (95% CI) <sup>a,b</sup>
Dietary behaviour	Absence of consumption of sugary drinks	19.0 (0.9)	23.8 (1.4)	0.003	1.29 (1.05;1.58)
	Low consumption of fruit juice	40.6 (1.1)	37.7 (1.6)	0.137	0.84 (0.71;1.00)
	Daily breakfast	84.1 (0.8)	85.7 (1.1)	0.260	1.04 (0.82;1.33)
Physical-activity-related behaviour	Regular active transport to work	23.4 (1.0)	33.7 (1.6)	<0.001	1.65 (1.36;1.99)
	Regular participation in sports	24.7 (1.0)	23.0 (1.4)	0.341	0.96 (0.78;1.18)
Sedentary behaviour	Limited time spent in front of screens of any type	14.1 (0.8)	18.8 (1.4)	0.002	1.32 (1.05;1.67)
Parenting practices	Frequent monitoring	8.2 (0.6)	25.8 (1.4)	<0.001	3.63 (2.86;4.60)
	Infrequent permissiveness	37.5 (1.1)	35.5 (1.5)	0.280	0.87 (0.73;1.03)
	Frequent negotiation	31.5 (1.0)	17.6 (1.2)	<0.001	0.39 (0.32;0.49)
	Frequent encouragement of healthy lifestyles	12.5 (0.7)	31.8 (1.5)	<0.001	3.03 (2.45;3.74)
	Self-efficacy for handling children	12.5 (0.7)	16.2 (1.2)	0.005	1.42 (1.12;1.80)
	Avoidance of negative models	17.3 (0.8)	6.2 (0.8)	<0.001	0.28 (0.20;0.38)

NETH: The Netherlands, BEL: Belgium, NOR: Norway, SE : Standard error. <sup>a</sup>Results adjusted for sex, age, SES and BMI. <sup>b</sup>Country of reference: Spain

hours per day for Spanish parents. In terms of parenting practices, parents from countries in the north negotiated more with their children than did Spanish parents (mean: 1.68 in Northern Europe vs. 1.26 in Spain) and were more given to avoiding negative behavioural models (mean: 1.29 vs. 0.90 respectively). For their part, parents from Spain were more attentive and encouraged healthy lifestyles to a greater degree (mean: 2.38 in Spain vs. 2.06 in Northern Europe).

The last column shows the association between country of origin and the different variables analysed as continuous variables, using the beta coefficient of regression as the measure of association and Spain as reference. Statistically significant differences agree with those observed in the above-mentioned columns, with the only variables not proving statistically significant being those relating to breakfast and permissiveness, inasmuch as the confidence interval of the beta coefficient included the value 0 in both cases, as can be seen in the case of breakfast (beta coefficient: 0.076; CI:-0.049;0.202).

**Table 2** shows the prevalences of each of the variables by country of origin, and the association between country of origin, taking Spain as reference, and parent-related variables, expressed as a percentage. The patterns observed were very similar to those shown in Table 1, yet there were some exceptions. Here, no statistically significant differences were observed with respect to consumption of fruit juice, with 40.6% of Northern European parents vs. 37.7% of Spanish parents registering a low consumption. With respect to parenting practices, while 8.2% of Northern European parents reported always paying attention to their children's lifestyles, this percentage rose to 25.8% among Spanish parents. On the other hand, a total of 31.5% of Northern European parents frequently negotiated with their children about lifestyle habits but only 17.6% of Spanish parents reported having done so. Frequent encouragement of healthy lifestyles was acknowled-

ged by 31.8% of Spanish parents vs. 12.5% of Northern European parents. When it came to avoiding negative behavioural models, 6.2% of Spanish parents reported frequent avoidance vs. 17.3% of Northern European parents.

The last column shows the association between country of origin, taking Spain as reference, and parent-related variables expressed as a percentage, using the OR as a measure of association. The association was statistically significant for most of the variables, and for those pertaining to lifestyle in particular. The probability of consuming sugary drinks was 29% higher in Northern European countries. Furthermore, Northern European parents registered a 32% higher probability of being sedentary for over 3 hours per day. In terms of parenting practices, the position for the respective variables was as follows: in the case of monitoring, Spanish parents reported having a 3.63% higher probability of always paying attention to their children; in the case of encouragement of healthy lifestyles, the probability of very frequently or always encouraging children to adopt such lifestyles was 3.03 times higher among Spanish parents; and lastly, in the case of avoidance of negative behavioural models, Northern European parents had a 28% higher probability of always avoiding negative models.

## DISCUSSION

Our study shows that Spanish parents consume sugary drinks on fewer days per week but consume more fruit juice than do their Northern European counterparts. Similarly, Spanish parents tend to be more active going to work and less sedentary, yet engage in sports activities on fewer days per week than do those from Northern Europe. In terms of parenting practices, while Spanish parents are less inclined to negotiate with their children and display more negative behavioural models, they pay more attention to their children and encourage healthy lifestyles to a greater extent than do Northern European parents.

The choice of foods that go to form part of a given diet is the result of a complex interaction between biological and socio-cultural processes, in which food preferences and aversions, values, symbolism and traditions all play an important role.<sup>26</sup> Hence, it is in no way strange to find differences in dietary habits between Spain and Northern Europe.

Likewise, habits linked to physical activity and sedentarism also appear to differ among countries. Our findings on sedentarism and physical activity coincide with those recorded in the Eurobarometer Study, in which adults from Spain proved to be less sedentary and yet engaged in less leisure-time physical activity.<sup>27</sup>

Insofar as parenting practices are concerned, the results of this study coincide in part with those of another study, which observed that Spanish parents displayed a more neglectful parenting style in comparison with countries such as Belgium or The Netherlands, where parents were more authoritative.<sup>28</sup> Similarly, a European study coming within the IDEFICS study (Identification and prevention of Dietary- and lifestyle-induced health EFfects In Children and infants) observed that while Spanish parents limited unhealthy foods and sugary drinks, they nevertheless used sweets as a reward after meals and were more concerned about sedentary behaviour than were parents from Northern European countries such as Germany or Sweden.<sup>29</sup>

The family provides children with their first social-learning setting and is the original site of exposure to food choices, eating habits and opportunities to participate in play and other physical activities.<sup>30</sup> It is thus obvious that the family environment plays a fundamental role in both the development of and reduction in obesity.

Although there has been much theoretical discussion about the fact that parents' beliefs and practices might be modifiable determinants for preventing childhood obesity and

excessive adiposity,<sup>31</sup> it is evident that the relationship between parental feeding and parenting practices on the one hand and obesity risk in children on the other, are complex and do not seem to have the same effect on all individuals.<sup>32</sup> It should be borne in mind here that a number of authors have drawn attention to cultural diversity or ethnic differences in parenting styles, which may be due to differences in social context or the cultural significance of specific dimensions of the parenting style itself.<sup>33,34</sup>

Recent assessments indicate that parents' participation in and monitoring of child health behaviours are important factors to be considered in the prevention and treatment of childhood obesity<sup>35-37</sup> This assertion agrees only in part with the results of this study. On the one hand, Spanish parents engage in sports on fewer days per week, something that could have a negative impact on their children. However, Spanish parents report giving greater encouragement to healthy lifestyles and being more attentive than do parents from countries in the north. Even so, the prevalence of obesity is higher in Spain.

Other factors, aside from those targeted by this study, may also account for inter-country differences in the prevalence of obesity, e.g., socio-economic or environmental factors specific to the country in question. For instance, in 2010 the population percentage at risk of poverty or exclusion was 26.7% in Spain vs. 15.1% in The Netherlands.<sup>38</sup> Such inter-country differences in socio-economic level might well have an influence on accessibility to certain types of foods and/or different degrees of knowledge or awareness about healthy lifestyles. Moreover, the fact of a given environment being more or less obesogenic could also partly explain the differences observed.

Among the study's limitations, it is important to highlight the fact that most of the variables analysed were self-reported by the interviewees, which might reflect a certain degree of subjectivity in the answers, though all the variables used were validated. Such

subjectivity can vary between one country and another, and might thus have affected the differences observed among countries. Lastly, mention should be made of the different representativeness of the sample in each of the countries studied, something that could hinder inter-country comparisons to a certain extent.

The conclusion to be drawn after analysing the variables linked to nutritional practices, physical activity and parental care and observing that their implication in the development of obesity is highly complex, is that future research should aim at identifying the factors which explain the differences observed in the prevalence of obesity among countries.

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