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## Trabajo Original

Pediatría

### Frequency and quality of mid-afternoon snack among Spanish children *Frecuencia y calidad de la merienda en niños españoles*

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#### Abstract

**Introduction:** There are increasing concerns about the types of foods and beverages consumed by children during mid-afternoon snack in Spain.

**Aim:** To describe the frequency and quality of the mid-afternoon snack in a representative sample of Spanish children.

**Methods:** A total of 1,233 younger (three to six years) and 1,618 older (seven to twelve years) children participated in the study. The report of food and beverages consumed per week during the mid-afternoon snack meal (*merienda*) was obtained by an online platform.

**Results:** An 84.4% of younger and 78.3% of older children were mid-afternoon snack consumers. Regular consumers were more likely to be from the South and the Centre regions. Sandwich was the most consumed food item among younger (49.5%) and older (59.7%) consumers; 46.5% of mid-afternoon snacks contained two food items among younger children, and 50.1% of mid-afternoon snacks contained one food item among older children. "Fruit", "milk and biscuits", and "fruit, biscuits and juices" were the most consumed combinations when considering one, two and three or more food items during one-time mid-afternoon occasion, respectively.

**Conclusions:** The frequency of mid-afternoon snack occasions and the number and quality of food items consumed during one-time mid-afternoon snack occasion decrease with age. Spanish children should increase the frequency of mid-afternoon snack consumption and include healthy options in their menus. Longitudinal and intervention studies are needed to address the health impact of snacking and how to use this meal occasion to balance children's diets.

#### Key words:

Snacking. Diet. Food consumption. Meal occasion.

#### Resumen

**Introducción:** hay cada vez más preocupación acerca del tipo de alimentos y bebidas consumidos durante la merienda por los niños españoles.

**Objetivo:** describir la frecuencia y la calidad de la merienda en una muestra representativa de niños españoles.

**Métodos:** un total de 1.233 niños jóvenes (de tres a seis años) y 1.618 mayores (de siete a doce años) participaron en el estudio. Los alimentos y bebidas consumidos por semana durante la merienda se obtuvieron mediante una plataforma en línea.

**Resultados:** el 84,4% de los niños pequeños y el 78,3% de los niños mayores eran consumidores de merienda. Los consumidores regulares eran, con mayor probabilidad, del sur y de las regiones del centro. El bocadillo fue el alimento más consumido entre los consumidores pequeños (49,5%) y mayores (59,7%). El 46,5% de las meriendas entre los pequeños contenían dos alimentos y el 50,1% de las meriendas entre los mayores contenían únicamente un alimento. "Frutas", "leche y galletas" y "frutas, galletas y zumos" fueron las combinaciones más consumidas al considerar uno, dos y tres o más alimentos durante una sola ocasión de merienda, respectivamente.

**Conclusiones:** la frecuencia de las ocasiones de merienda, así como el número y la calidad de los alimentos consumidos disminuyen con la edad. Los niños españoles deberían aumentar la frecuencia de consumo de la merienda e incluir opciones saludables en sus menús. Se necesitan estudios longitudinales y de intervención para abordar el impacto en la salud de la merienda y cómo usar esta ocasión de comida para equilibrar las dietas de los niños.

#### Palabras clave:

Tentempié. Dieta. Consumo de alimentos. Comida.

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## INTRODUCTION

In Western societies, daily eating is usually organized in three main meals: breakfast, lunch and dinner, but according to experts, children should eat at least four meals. Snacking indicates the process of any food intake outside the three main meals and encompasses meal snacks, including mid-morning snack (between breakfast and lunch) and mid-afternoon snack (between lunch and dinner) and nibbling (1). Nibbling indicates the process of consuming foods outside of main meals, but disorganized and without defined timing. For these reasons, nibbling is considered as an unhealthy behavior as it is associated with overweight and obesity in children (2,3). However, mid-morning and -afternoon snacks can act as facilitator mechanisms for energy compensation and adjustment to energy and nutrient requirements (2).

In Spain, 41.3% of children from six to nine years of age are overweight or obese according to the last survey in 2015 (4). However, studies about the potential association between obesity and mid-morning and -afternoon snacks in Spanish children are still lacking. In other countries, mid-afternoon snack is more frequently consumed than mid-morning snack (5,6), and it is consumed by 80 to 90% of the children. In the United States, 79.7% of children from four to eight years and 75.8% from nine to 13 years report mid-afternoon snacking (5). In Brazil, 97% of children between four and six and 78% of children older than ten report a mid-afternoon snack daily (6,7), and in France, where mid-afternoon snack is a traditional meal, the consumption increases up to 87% of children from nine to eleven years of age (8). These studies have also shown that the percentages of meal snack consumers differ between younger and older children (5,6), with decreasing number of snack meals among older children.

There are increasing concerns about the types of foods and beverages consumed during snack meals by children and their nutritional quality (9), particularly where childhood obesity is a public health issue (8). In some countries, sweets and savoury snacks are the major contributors to snacking (5,8), and preferences across childhood span may change, decreasing fruit consumption and increasing sweets consumption (5,10).

A better understanding of the types of foods eaten as afternoon snacks in Spain may lead to opportunities of better educating caregivers and children about what they should consume. Therefore, the purpose of this study was to describe the frequency and quality of the mid-afternoon snack meals (*merienda*) and their age differences, along with other parameters like gender or geographic origin, in a representative sample of Spanish children.

## METHODS

### STUDY SAMPLE

The sampling and recruitment process was performed by Kantar World Panel (KWP), a grocery shopper panel. In 2015, KWP measured the purchase of 12,000 demographically representative households in Spain and registered information on

food consumption of 4,000 households included in this study. This study included 2,851 Spanish children (1,415 girls) aged 3-12, stratified by geographical location, age and socioeconomic status. Children were included in the study sample if the mother was older than 18. Participants were recruited from six different regional areas: a) Cataluña, Aragón and Baleares, including Cataluña, Baleares, Huesca and Zaragoza; b) Levante, including Comunidad Valenciana, Murcia and Albacete; c) South, including Andalucía and Badajoz; d) Centre, including Zamora, Valladolid, Segovia, Soria, Guadalajara, Teruel, Cuenca, Madrid, Ávila, Salamanca, Cáceres, Toledo and Ciudad Real; e) North-Centre, including La Rioja, Navarra, País Vasco, Cantabria, Burgos and Palencia; and f) North-West, including Galicia, Asturias and León. Socioeconomic status was estimated according to employment status. Unemployed families were defined as those with at least one of the two members unemployed; a retired person was not considered in this category. Informed consent was obtained from all participating children and their parents.

### DIETARY ASSESSMENT

KWP collected information on what families were buying. Individual food and beverages consumed per week during mid-afternoon snack occasions were obtained by an online platform. Parents registered their children intake using an online food record. The food record of seven consecutive days was fulfilled twice by the parents in two different time periods in 2015. All the foods and beverages consumed at home and outside home during the mid-afternoon snack were registered and expressed as consumption in times per week.

Foods and beverages were gathered into 14 groups: sandwiches (savory or sweet), biscuits, cereal breakfast, cakes and pastries, chocolate, fruit, juices, milk and milkshakes, yogurt, dairy desserts, dried fruit and nuts, chips, mineral water and other food groups (contributing to less than 1% of the mid-afternoon snack consumption). Mid-afternoon snack consumers were divided into occasional consumers and regular consumers. Children were classified as occasional consumers when they were taking from one to four mid-afternoon snacks per week, and as regular consumers when they were taking from five to seven.

To further investigate mid-afternoon snack patterns, we considered the quality of mid-afternoon snacks by one-time occasion, registering those food items that were consumed with other food items in combination or were eaten alone. Mid-afternoon quality was evaluated based on the diversity, the number and the type of food groups consumed.

### STATISTICAL ANALYSIS

The Statistical Package for the Social Sciences for Windows version 20 (SPSS Inc., Chicago, IL, USA) was used to carry out all statistical analyses. All analyses were stratified according to age, from three to six and from seven to twelve years of age.

Significance was set at  $p$ -value  $< 0.05$ . Chi-squared tests were performed to study differences between occasional ( $< 4$  times/week) and regular consumers ( $\geq 4$  times/week).

## RESULTS

In the present study, 84.4% of children aged three to six and 78.3% of children aged seven to 12 were mid-afternoon snack consumers, consuming at least one snack per week. Of all mid-afternoon snack consumers, 42.1% of children aged three to six and 41.2% of children aged seven to 12 were regular consumers ( $> 4$  times/week); 16.5% and 13.7% of younger and older children, respectively, consumed a mid-afternoon snack every day (Fig. 1).

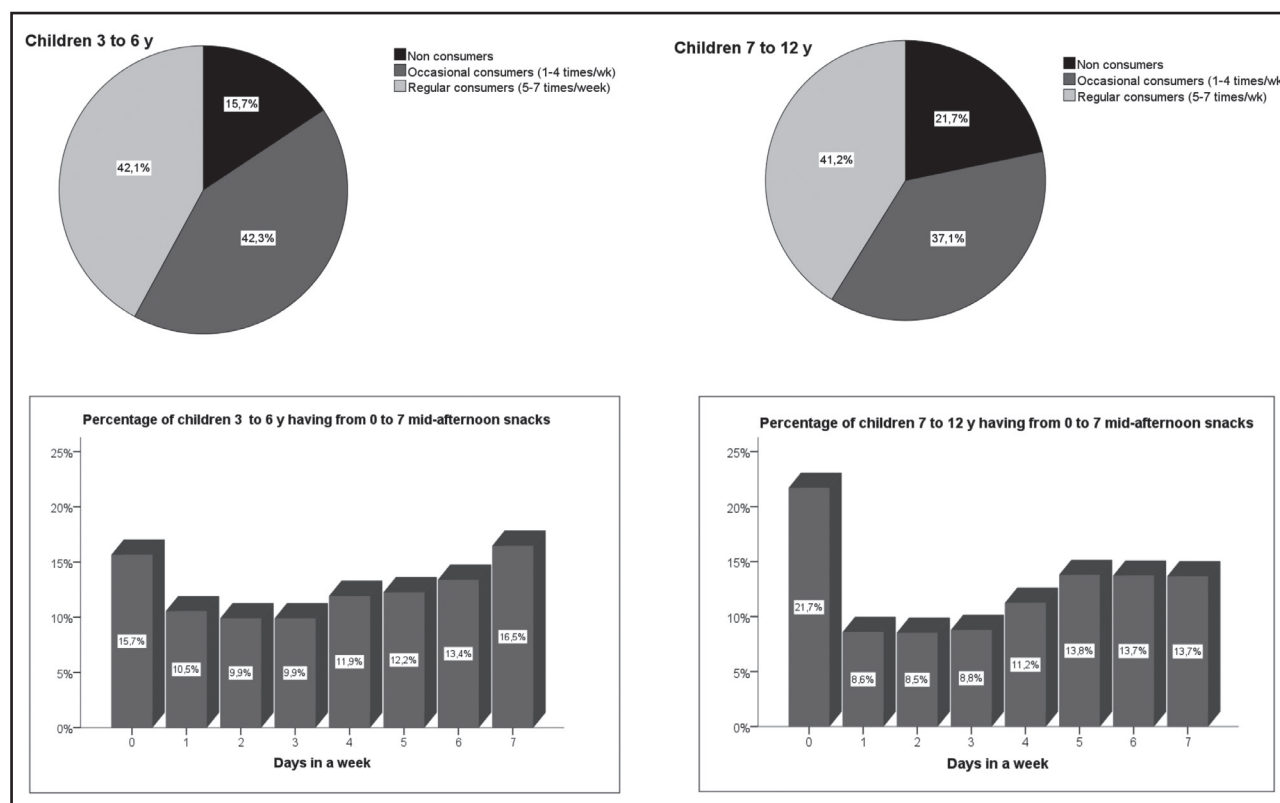
Distribution of mid-afternoon snack consumers showed differences between regions. Among younger and older children, regular consumers were more likely to be from the South and the Centre regions. We did not observe differences between genders or employed and unemployed families in relation to mid-afternoon snack consumption prevalence (Table I).

Consumption of 14 different food groups was observed at mid-afternoon snacking. Both age groups consumed primarily sandwich and fruits, followed by biscuits and yogurt among younger children or milk and milkshakes and juices among old-

er children. In addition, 49.5% of younger and 59.7% of older children consumed sandwich, followed by 48.4% and 44.5% of younger and older children, respectively, who consumed fruit at least once per week. Fruit was the most consumed food item among regular younger consumers (62%), followed by sandwich (59%), biscuits (55%) and yogurt (50%). Sandwich was the most consumed food item among regular older consumers (64%), followed by fruit (50%) and biscuits (50%) (Tables II and III).

A total of 14 and 15 one-food mid-afternoon snacks were identified among younger and older children, respectively. A total of 62 and 69 different combinations of two-food mid-afternoon snacks were identified among younger and older children, respectively. A total of 130 and 147 different combinations of three-or-more-food mid-afternoon snacks were identified among younger and older children, respectively (Tables IV and V).

Differences in the number of food items consumed in each mid-afternoon occasion were observed between younger and older children. Forty-four per cent and 50.1% of mid-afternoon snacks among younger and older children, respectively, included one food item, whereas 46.5% of mid-afternoon snacks included two food items among younger children. "Fruit", "milk and biscuits", and "fruit, biscuits and juices" were the most consumed combinations when considering one, two and three or more food items during one-time mid-afternoon occasion in younger and older children, respectively (Tables IV and V).



**Figure 1.**

Frequency of mid-afternoon snacks among Spanish children.

**Table I.** Afternoon snacking among Spanish children (n = 2,851)

<b>3-6 years</b>	<b>Non-consumers (n = 193)</b>	<b>Occasional consumers (n = 521)</b>	<b>Regular consumers (n = 519)</b>	<b>p</b>
Girls n (%)	82 (42.5)	256 (49.1)	253 (48.7)	0.26
Unemployed families n (%)	68 (35.2)	214 (41.1)	207 (39.9)	0.36
<i>Regions</i>				0.000
Cataluña-Aragón-Baleares n (%)	41 (20.3)	59 (11.3)	67 (12.9)	
Levante n (%)	39 (20.2)	64 (12.3)	63 (12.1)	
South n (%)	24 (12.4)	132 (25.3)	122 (23.5)	
Centre n (%)	49 (25.4)	143 (27.4)	138 (26.6)	
North-Centre n (%)	19 (9.8)	64 (12.3)	89 (17.1)	
North-West n (%)	21 (10.9)	59 (11.3)	40 (7.7)	
<b>7-12 years</b>	<b>Non-consumers (n = 351)</b>	<b>Occasional consumers (n = 601)</b>	<b>Regular consumers (n = 666)</b>	<b>p</b>
Girls n (%)	191 (54.4)	316 (52.6)	317 (47.6)	0.07
Unemployed families n (%)	148 (42.2)	220 (36.6)	251 (37.7)	0.22
<i>Regions</i>				< 0.001
Cataluña-Aragón-Baleares n (%)	73 (20.8)	165 (27.5)	115 (17.3)	
Levante n (%)	63 (17.9)	71 (11.8)	85 (12.8)	
South n (%)	42 (12)	111 (18.5)	133 (20)	
Centre n (%)	48 (30)	64 (22.5)	216 (32.4)	
North-Centre n (%)	102 (29.1)	118 (19.6)	71 (10.7)	
North-West n (%)	24 (6.8)	53 (8.8)	46 (6.9)	

**Table II.** Proportion of 3-6 years old children consuming each food item

	<b>Total (n = 1,040)</b>	<b>Occasional consumers (n = 521)</b>	<b>Regular consumers (n = 519)</b>
Sandwich n (%)	515 (49.5)	210 (40.3)	305 (58.8)
Fruit n (%)	503 (48.4)	182 (34.9)	321 (61.8)
Biscuits n (%)	476 (45.8)	189 (36.3)	287 (55.3)
Yogurt n (%)	431 (41.4)	173 (33.2)	258 (49.7)
Milk and milkshake n (%)	405 (38.9)	167 (32.1)	238 (45.9)
Juices n (%)	387 (37.2)	161 (30.9)	226 (43.5)
Cakes and pastries n (%)	361 (34.7)	128 (24.6)	233 (44.9)
Chocolates n (%)	153 (14.7)	47 (9)	106 (20.4)
Dairy desserts n (%)	89 (8.6)	31 (6)	58 (11.2)
Others n (%)	54 (5.2)	20 (20.8)	34 (6.6)
Chips n (%)	44 (4.2)	18 (3.5)	26 (5)
Mineral water n (%)	35 (3.4)	10 (1.9)	25 (4.8)
Cereal breakfast n (%)	24 (2.3)	10 (1.9)	14 (2.7)
Dried fruit and nuts n (%)	24 (2.3)	11 (2.1)	13 (2.5)

## DISCUSSION

This is the first study that describes the mid-afternoon snack consumption among Spanish children. Snack prevalence among

Spanish children is relatively high; 81% of Spanish children are mid-afternoon snack consumers. Data were stratified by age because previous studies suggest that younger and older children have different food patterns (11).

**Table III.** Proportion of 7-12 years old children consuming each food item

	Total (n = 1,267)	Occasional consumers (n = 601)	Regular consumers (n = 666)
Sandwich n (%)	757 (59.7)	333 (55.4)	424 (63.7)
Fruit n (%)	564 (44.5)	228 (37.9)	336 (50.5)
Milk and milkshake n (%)	509 (40.2)	193 (32.1)	316 (47.4)
Juices n (%)	483 (38.1)	179 (29.8)	304 (45.6)
Biscuits n (%)	478 (37.7)	143 (23.8)	335 (50.3)
Cakes and pastries n (%)	453 (35.8)	146 (24.3)	307 (46.1)
Yogurt n (%)	410 (32.4)	150 (25)	260 (39)
Chocolates n (%)	226 (17.8)	64 (10.6)	162 (24.3)
Dairy desserts n (%)	80 (6.3)	28 (4.7)	52 (7.8)
Others n (%)	80 (6.3)	34 (5.7)	46 (6.9)
Dried fruit and nuts n (%)	64 (5.1)	23 (3.8)	41 (6.2)
Chips n (%)	63 (5)	28 (4.7)	35 (5.3)
Cereal breakfast n (%)	47 (3.7)	12 (2)	35 (5.3)
Mineral water n (%)	29 (2.3)	15 (2.5)	14 (2.1)

**Table IV.** Food items included during a mid-afternoon snack occasion among 3-6 years old Spanish children (n = 206)

Number of food items included in one mid-afternoon snack occasion	% of mid-afternoon snacks including in each food item category	Total number of food combinations in each food item category	Top 3 food items	
One food item	44	14	Fruit	33.8 <sup>β</sup>
			Sandwich	17.2
			Yogurt	13.2
Two food items	46.5	62	Milk + biscuits	13.8 <sup>ε</sup>
			Sandwich + juice	7.4
			Fruit + yogurt	7.3
Three food items or more	9.5	130	Fruit + biscuits + juice	9.2 <sup>γ</sup>
			Fruit + biscuits + yogurt	5.0
			Sandwich + fruit + yogurt	4.9

<sup>β</sup>Percentage of food item among all food items of mid-afternoon snack with one food item. <sup>ε</sup>Percentage of food item among all food items of mid-afternoon snack with two food items. <sup>γ</sup>Percentage of food item among all food items of mid-afternoon snack with three food items.

In Spain, the Centre and the South regions showed the larger number of regular mid-afternoon consumers (> 4 times per week). This is in line with previous studies, where differences in nutrient intakes have been previously reported among Spanish children from different Spanish regions (12). In previous studies considering the effect of socio-economic status, children with highly educated parents consumed significantly more snack meals than those with low-educated parents (13); however, we failed to find differences between employed and unemployed families in relation to mid-afternoon snack consumption frequency.

In agreement with the US, Brazil and France (5,6,8), we observed that mid-afternoon snack consumption prevalence

decreased with age. The number of food items consumed during a mid-afternoon snack occasion decreases with age; older children consume a unique food item, which is mainly fruit or sandwich. In younger children, combinations of food items are more frequent, although this is far from the recommendation as 44% of mid-afternoon snacks contain one food item. According to the Spanish Agency for Consumers and Food Safety and Nutrition (AECOSAN), mid-afternoon snack consumption should include 10% of the daily energy intake, and foods with high nutritional value such as fruits, dairy products or healthy sandwiches in order to complete the total daily intake (14). In our study, approximately half of mid-afternoon snacks included only one food item; considering that one

**Table V.** Food items included during a mid-afternoon snack occasion among 7-12 years old Spanish children (n = 231)

Number of food items included in one mid-afternoon snack occasion	% of mid-afternoon snacks including in each food item category	Total number of food combinations in each food item category	Top three food items	
One food item	50.1	15	Fruit	24.1 <sup>§</sup>
			Sandwich	24.1
			Milk and milkshakes	9.9
Two food items	43.9	69	Milk + biscuits	12.5 <sup>§</sup>
			Sandwich + juice	8.9
			Milk and milkshake + bakery and pastries	8.8
Three food items or more	6	147	Fruit + biscuits + juice	9.2 <sup>¶</sup>
			Fruit + biscuits + yogurt	5.0
			Sandwich + fruit + yogurt	4.9

<sup>§</sup>Percentage of food item among all food items of mid-afternoon snack with one food item. <sup>¶</sup>Percentage of food item among all food items of mid-afternoon snack with two food items. <sup>¶</sup>Percentage of food item among all food items of mid-afternoon snack with three food items.

piece of fruit or one yogurt contain approximately 60-100 kcal, another food item should be included in order to reach AECOSAN recommendations. Combinations of three or more food items are unfrequently consumed among both age groups; 9.5% and 6% of mid-afternoon snacks included three or more food items among younger and older children, respectively.

Most importantly, the snack quality decreased with age. The type of food items consumed when considering one food item were healthy and similar among younger and older children, except for the fact that yogurt is mostly consumed among younger and milk among older children. When considering two food items, we observed a lower prevalence of healthy combinations, especially among older children. Milk and biscuits and sandwich and juices were the two top combinations including two food items among younger and older children. Healthier combinations, like fruit and yogurt, contributed only to the 7.3% of all mid-afternoon snack combinations with two food items among younger children; among older children this combination was not included in the top three.

## STRENGTHS AND LIMITATIONS

This study has several strengths. This is the first study describing food items as well as the most frequent combinations of mid-afternoon snacks in Spanish children. We used a nationally representative population-based dietary intake data on a very large sample of individuals (> 2,800).

In contrast, we acknowledge several limitations. Portion sizes could not be determined and, therefore, it is not possible to evaluate the compliance with dietary recommendations. Also, mid-afternoon snacks that were bought outside home by the children were not registered and, consequently, some mid-afternoon snacking information could be missed, like for instance soft drinks.

We presume that water intake was higher than reported, because tap water consumption was not registered and the consumption of other beverages was very low in this study compared with other studies in the US or Brazil (5,6). Also, we did not find differences in mid-afternoon snacking prevalence between unemployed and employed families and this could be due to the fact that a unique unemployed family member may not reflect the socioeconomic status of the household.

## CONCLUSIONS

This is the first study showing mid-afternoon snack consumption prevalence among Spanish children. Our cross-sectional association findings provide important insights into snacking which could be used to inform parents and caregivers to promote healthy menus. In this regard, Spanish children should increase the frequency of mid-afternoon snack consumption per week in order to complete daily intake and include healthy options with different food items in their menus, especially older children.

Frequency and quality of mid-afternoon consumption in younger children is more appropriate than in older children. For this reason, mid-afternoon snack consumption in younger children should be promoted in order to avoid they become mid-afternoon snack skippers later in life and to encourage them to choose healthy options. The number of food items included in one mid-afternoon occasion should be increased in both age groups as well, as mid-afternoon snack consumption should contribute to the 10% of daily energy intake.

Longitudinal and intervention studies are needed to address the health impact of snacking and how to use this occasion to balance children's diets, meet their nutritional needs and promote a healthy diet.



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## CONFLICT OF INTERESTS

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