ORIGINAL RESEARCH

Comparative analysis of dietary guidelines for Spain

Carmen López-Briones[1], Oscar Zurriaga[2,3,4], Josep Bernabeu[5], Carmen Barona[4,6,7]

[1] Doctoral Programme in Health Sciences, University of Alicante, Spain

[2] Department of Epidemiology, Health Surveillance and Environmental Health, Regional Ministry of Health, Valencia, Spain

[3] Rare Diseases Research Area, FISABIO-Public Health, Valencia, Spain

[4] Centre for Network Research on Epidemiology and Public Health (CIBERESP), Madrid, Spain

[5] Department of Community Nursing, Preventive Medicine and Public Health and History of Science, University of Alicante, Spain

[6] Health Policy Planning and Evaluation Service, Ministry of Universal Health and Public Health, Valencia, Spain

[7] Health Inequalities Research Area, FISABIO-Public Health, Valencia, Spain

Corresponding author: Carmen López-Briones (email: carmenlopezbriones@gmail.com)

ABSTRACT

Background: In Spain, the incidence of obesity and noncommunicable diseases continues to rise, despite the attempts of health institutions to redirect the population towards a healthier nutritional model by adopting nutrition strategies and dietary guidelines. This study analyses the advice of Spanish dietary guidelines on daily food intake.

Methods: A comparative study of the content of 18 Spanish dietary guidelines was performed using the WHO Countrywide Integrated Noncommunicable Disease Intervention (CINDI) programme's dietary guide as the gold standard.

Results: There is evidence that contents differ among dietary guidelines: not all include the CINDI 12 steps to healthy eating and 72% ignore the recommendation for a "varied diet based mainly on plant foods". The advice is often not easy to follow: only one of the 18 guidelines includes household measures; most do not recommend specific foods; 73% do not mention which foods should be included in a balanced diet; and 61% do not define fatty foods. Other differences relate to serving size, food quantification, units used and recommended amounts.

Conclusions: This paper describes the variations among Spanish dietary guidelines that might lead individuals to develop a mistaken concept of what healthy eating is.

Keywords: CINDI – WHO, DIETARY GUIDELINES, DIETARY POLICIES, FOOD HABITS, HEALTH PROMOTION

INTRODUCTION

Unhealthy diet, lack of physical activity, excessive alcohol consumption and tobacco use are common behavioural risk factors associated with four disease clusters (cancer, cardiovascular disease, chronic pulmonary disease and diabetes) that account for about 80% of deaths from noncommunicable diseases *(1)*. As estimated by the Global Burden of Diseases Study 2010, mortality from these diseases increased from 57% in 1990 to 65% in 2010 *(2)*.

To change qualitative and quantitative food habits linked to the main chronic noncommunicable diseases, preventive strategies should aim to encourage people to adopt and maintain healthy living choices by promoting health education *(3)*. Consequently, food guidelines are needed to educate the population about the components of a balanced diet. They should outline the most useful eating patterns for achieving an adequate energy and nutrient intake for both short- and long-term health improvements *(4)*.

In Spain, the first dietary guideline was developed in 1961 within the framework of the EDALNU strategy for education on healthy eating and nutrition *(5)*, with the aim of improving the population's nutritional status and, subsequently, health. The EDALNU strategy

used a food wheel that was widely used as a resource to teach the population how to achieve a balanced diet by classifying foods into groups with similar nutritional characteristics. This Spanish food-based dietary guideline remained in place for the next 30 years. Following this, the Spanish Society of Community Nutrition (SENC) Healthy eating guide was first published in Spain in 1995 (with the latest update in 2016) *(6)*.

The publication of WHO's Global strategy on healthy eating and physical activity in 2004 *(7)* encouraged the Spanish Agency for Consumer Affairs, Food Safety and Nutrition (AECOSAN) to develop a strategy for nutrition, physical activity and obesity prevention (the NAOS strategy) in 2005 *(8)*, which aimed to reverse the trend toward increased obesity prevalence by promoting healthy eating and physical activity. Within the NAOS framework, various programmes and studies were later developed with the same goal, for example, the Pilot programme for the promotion of healthy food and physical activity in school (PERSEO programme) targeted schoolchildren aged 6–11 years *(9)*. The NAOS strategy also encouraged some Spanish autonomous regions and city councils to participate in promoting a healthy lifestyle by launching nutritional education campaigns complemented by their own dietary guidelines.

These actions promoted an awareness of the benefit of a varied, balanced diet. However, studies have reported wide-ranging perceptions of healthy eating, with understanding of the term "varied and balanced diet" varying among individuals *(4)*. Individuals within a population might therefore take the wrong approach by confusing a balanced diet with a slimming diet; moreover, the use of alternative therapies and products that do not have evidence-based health benefits might increase when health guidelines are unclear *(10)*. It is therefore necessary to ensure that the information included in dietary guidelines is correct and comprehensible by the target group *(11)*.

The objective of this study was to compare dietary recommendations in a set of 18 food-based dietary guidelines for the Spanish population with those specified by WHO. The results of this study could advise future public health nutrition initiatives.

METHODOLOGY

A search for definitions of "healthy eating" and dietary recommendations from health and scientific organizations published in the English language from 1961 to 2013 was

TABLE 1. THE CINDI TWELVE STEPS TO HEALTHY EATING[a]

1. Eat a nutritious diet based on a variety of foods originating mainly from plants, rather than animals
2. Eat bread, grains, pasta, rice or potatoes several times per day
3. Eat a variety of vegetables and fruits, preferably fresh and local, several times per day (at least 400 g per day)
4. Maintain body weight between the recommended limits (a BMI of 20–25 kg/m^2) by performing moderate levels of physical activity, preferably daily[b]
5. Control fat intake (not more than 30% of daily energy) and replace most saturated fats with unsaturated vegetable oils or soft margarines
6. Replace fatty meat and meat products with beans, legumes, lentils, fish, poultry or lean meat
7. Use milk and dairy products (kefir, sour milk, yoghurt and cheese) that are low in both fat and salt
8. Select foods that are low in sugar, and eat refined sugar sparingly, limiting the frequency of sugary drinks and sweets
9. Choose a low-salt diet. Total salt intake should not be more than one teaspoon (6 g) per day, including the salt in bread and processed, cured and preserved foods. (salt iodization should be universal where iodine deficiency is endemic)
10. If alcohol is consumed, limit intake to no more than two drinks (each containing 10 g of alcohol) per day
11. Prepare food in a safe and hygienic way. Steam, bake, boil or microwave to help reduce the amount of added fat
12. Promote exclusive breastfeeding and the introduction of safe and adequate complementary foods from the age of about 6 months, but not before 4 months, while breastfeeding continues during the first year of life[c]

[a] The CINDI dietary guide highlights 12 key areas for action. It summarizes them as steps; each step is accompanied by a detailed explanation in the following pages. It is important that each step be considered, not in isolation, but within the context of all of the other steps.

[b] BMI is derived from a person's weight in kg, divided by height in m^2.The recommended values are adapted from WHO global recommendation of 18.5–24.9 kg/m^2 as a normal BMI ***(28)***.

[c] Michaelsen et al. (2000) ***(29)***.

done using the following bibliographic repositories: PubMed, Web of Science, ScienceDirect and Google Scholar. The search terms were "healthy eating", "dietary guidelines", "healthy diet", "healthy food", "health organizations", "balanced diet", "European dietary guidelines", "WHO dietary guidelines", "recommendations on healthy eating" and "Spanish dietary guidelines".

We identified 18 dietary guidelines for Spain *(5, 6, 8, 9, 12–25)*. We used qualitative and quantitative methods to perform a comparative analysis of the food recommendations within these guidelines with the gold standard, Food-based dietary guidelines of the United Nations Food and Agriculture Organization *(26)*, based on the dietary recommendations of the WHO Countrywide Integrated Noncommunicable Diseases Intervention (CINDI) food guidelines *(27)*, which recommend 12 steps for healthy eating (see Table 1).

The CINDI dietary guide has been the starting point for various community nutrition intervention strategies within European countries *(30–32)*. It was created as part of the CINDI programme *(27)*, and its objective is to assist Member States of the European Union to develop policies and programmes to promote the adoption of healthy food consumption, consistent with the culture and food availability in the geographical area.

In a comparative analysis, the guidelines were first assessed for the inclusion of each of the 12 CINDI steps, followed by data analysis with the results shown as the percentage of guidelines that include a specific parameter (Table 2).

TABLE 2. RELATIONSHIP OF PARAMETERS IN THE 18 FOOD DIETARY GUIDELINES FOR SPAIN TO THE 12 CINDI STEPS

Step	Specifies foods of the CINDI step		Includes servings		Quantified[a]		Includes a food table		Quotes SENC tables		Includes own food pyramid		Quotes the NAOS decalogue	
	n	%	*n*	%	*n*	%	*n*	%	*n*	%	*n*	%	*n*	%
1	5	28	1	5.5	0	0	0	0	1	5.5	2	11	1	5.5
2	11	61	7	39	8: 4 in g, 3 in %, 1 in hm	44	1	5.5	0	0	2	11	1	5.5
3	13	72	11	60	6 in g	33	1	5.5	0	0	2	11	1	5.5
4A	NA	NA	9	50	2 in %	11	0	0	0	0	0	0	1	5.5
4B	12	67	4	22	6: 3 in 30–60 min/d; 3 in 1 h/d	50	–	–	–	–	–	–	–	–
5A	7	39	4	22	6: 1 in g, 2 in l, 3 in %	33	0	0	1	5.5	2	11	1	5.5
5B	6	33	1	5.5	3:1 in g of ch, 2 in %	5.5	0	0	0	0	1	5.5	1	5.5
6	13	72	8S	44	7: 6 in g, 1 in %	39	1	5.5	1	5.5	1	5.5	1	5.5
7	15	83	2S	1	2: 1 in g, 1 in %	11	0	0	0	0	1	5.5	1	5.5
8	13	72	8S	44	7: 6 in g, 1 in %	39	1	5.5	1	5.5	1	5.5	1	5.5
9	7	39	4S	22	3: 1 < 1 ts/d, 1 < 0.25 g/100g, < 5 g/d	17	0	0	0	0	0	0	1	5.5
10	4	22	4S	22	6: 3 in hm, 1 in g, 2 in l	33	1	5.5	0	0	0	0	0	0
11	1	5.5	–	NA	NA	NA	0	0	0	0	0	0	0	0
12	NA	NA	2S	11	NA	NA	0	0	0	0	0	0	0	0

[a] In grams (g), litres (l), percentages of total daily energy intake (%), home measures (hm) or ts (teaspoons) ch (cholesterol).

d: day; h: hour; Lf: includes advice on lowering fat; min: minutes; S: servings; NA: not applicable.

The quantitative (i.e. results given as numbers and percentages) and qualitative analysis of important variables related to each CINDI step included: (i) specification of foods related to the recommendation of each CINDI step; (ii) recommendations for daily servings; (iii) quantification of servings in grams, litres, percentage of total daily energy intake or home measures (e.g. a bread roll, a cup size, a plate size, a spoonful) (iv) inclusion of food tables; (v) inclusion of the SENC tables (vi) inclusion of a pyramid or food wheel; and (vii) inclusion of the 10 main points (the so-called decalogue) of the NAOS strategy. Moreover, Table 3 contains the inclusion and specification of the 12 CINDI steps in the identified guidelines, ordered by year of publication, to show whether the content of guidelines had improved over time.

For successful implementation of a food recommendation, the food guide must be easily understood, adapted to their circumstances of the target group and easy to follow in daily practice *(3)*. These parameters were also assessed.

RESULTS

Our analysis of the degree of incorporation of the 12 CINDI steps and diet specifications into the 18 guidelines (see Table 1), along with their distribution in terms of numbers and percentages and how their contents relate to the 12 CINDI steps, is summarized in Table 2. Almost three quarters of the guidelines (72%) do

TABLE 3. DIETARY GUIDELINES ANALYSIS

Year	Dietary guideline	CINDI step													
		1	2	3	4A	4B	5A	5B	6	7	8	9	10	11	12
1961	EDALNU wheel of the seven food groups *(5)*	I	I S	I	–	–	I S	–	I S	I S	–	–	I S	–	–
2001	Healthy eating guide, Vitoria City Council *(12)*	–	I S	I S	–	–	I S	–	I S	I S	–	–	–	–	–
2002	SENC food guide *(6)*	–	I S	I S	I S	I S	I S	I S	I S	I S	I S	I	I S	I	I S
2003	WHO food guide *(13)*	–	I	I S	I S	I S	I	I S	I S	I S	I S	–	I S	I	I S
2004	Healthy eating in schools, Andalusia *(14)*	I S	I S	I S	–	–	–	–	–	–	–	–	–	–	–
2005	NAOS strategy *(8)*	I	I S	I S	–	I S	I S	I S	I S	I	I S	I S	–	–	I
2005	Dietary advice guide, Spanish College of Physicians *(15)*		I	I S	–	I S	I	I	I S	S	I S	I S	I S	I S	S
2007	Guide to the NAOS strategy within the WHO framework *(16)*	–	–	–	–	–	–	–	–	–	–	–	–	–	–
2008	Guide to food and physical activity for schoolchildren, Murcia City Council *(17)*	I S	I S	I S	–	–	I S	I S	I S	I S	I S	I S	–	I S	–
2008	PERSEO guide for families *(9)*	I S	I S	I S	I S	I S	I S	I S	I S	I S	I S	–	–	–	–
2008	Healthy eating guide, Asturias *(18)*	I S	I	I S	–	I S	I	I	I S	I S	I S	I S	–	–	–
2008	Nutrition guide for adolescents, Valencia City Council *(19)*	I	I S	I S	I	I S	I S	–	I S	I S	I S	–	–	–	–
2008	PERSEO school lunch guide: pilot programme in schools for health promotion, physical activity and obesity prevention *(20)*	–	I S	I S	–	–	–	–	I S	–	–	–	–	–	–
2008	Healthy eating guide, Gypsy Secretary Foundation *(21)*	–	I S	I S	–	I S	I S	I S	–	I S	–	–	–	–	–
2009	FAO dietary recommendations for Spain: Urreca project *(22)*	–	–	–	–	–	–	–	–	–	–	–	–	–	–
2010	Healthy eating program for children and adolescents, Cantabria region *(23)*	I S	I S	I S	I S	I S	I S	I S	I S	I S	I S	I S	–	–	–
2013	White paper on nutrition in Spain *(24)*	I	I S	I	I	I S	I S	I S	I S	I S	I S	I S	I S	–	–
2013	WHO country profile for Spain *(25)*	–	–	–	–	–	–	–	–	–	–	–	–	–	–

FAO: United Nations Food and Agriculture Organization; I: includes the CINDI steps; S: specifies foods related to the CINDI steps.

not include the recommendations of step 1 (a varied diet based mainly on foods of plant origin). Furthermore, recommendations of both steps 11 (hygiene in food preparation) and 12 (exclusive breastfeeding for infants) were found in only 17% of guidelines. Only two of the 18 guidelines included recommendations related to step 4A (maintain an acceptable body mass index (BMI)), while those related to step 4B (perform moderate levels of physical activity) were included in slightly more than half of guidelines (55.5%). Likewise, less than half of guidelines (eight out of 18) recommended a low salt intake (step 9), only 60% recommended low sugar consumption (step 8), and slightly more than half (55.5%) recommended a low intake of saturated fats (step 5B). Thus, none of the guidelines addressed all 12 CINDI steps.

Regarding the specification of foods related to each CINDI step (see Table 2), consumption of mainly plant–based foods was specified in only 28% of guidelines and none mentioned that these foods should come from the local region, as recommended in the CINDI dietary guide.

Detailed advice on which foods contain high levels of salt was included in just over a third (39%) of guidelines and sugary foods were not specified in 17%. The CINDI dietary guide recommends eating dairy products that are low in fat; however, only three guidelines (17%) included this specification (see Table 2).

Recommendations for the number of servings and how they were quantified (in grams, in litres or as a percentage of the total daily energy intake) were different in every guideline analysed (see Table 2). The number of recommended servings for step 1 was included in only one guideline. Recommendations for exclusive breastfeeding for infants and for the number of servings of low-sugar foods were included in only two guidelines: one quantified the serving size in grams and another as a percentage of the total daily intake.

Recommendations for salt intake included serving size in four guidelines, with three specifying the percentage of total daily energy intake. Recommendations for both the number of servings of lean meat, poultry, fish and legumes (step 6) and the number of low-fat milk and low-fat dairy products (step 7) were found only in eight publications. Serving sizes for step 8 foods were quantified in seven guidelines (six in grams and one as a percentage of the total daily energy), while serving sizes for step 9 foods were found in four guidelines and were expressed as a percentage of the total daily energy intake.

Recommendations for limiting alcohol intake (step 10) included serving size in four guidelines, and recommendations on eating bread, cereals, rice and/or pasta (step 2) included quantities in four. In addition, recommended servings of total fat were included in four guidelines and of saturated fat in only one.

Home measures were used in recommendations related to step 2 (for carbohydrate-rich food) in one guideline; step 5A (low total fat intake) in one guideline; step 9 in three guidelines and step 10 in three guidelines (see Table 2).

Only one of the guidelines provided its own table of foods with recommended amounts and only one quoted SENC tables *(5)* and the NAOS strategy decalogue *(7)*.

Regarding the inclusion of food images to help users to understand what a balanced diet consists of, only two food pyramids and one food wheel were included in the 18 guidelines (see Table 2).

DISCUSSION

This article analyses key aspects of a sample of dietary guidelines for Spain. It describes the inconsistencies among the guidelines, which may explain the difficulties experienced by the target population in using them.

The United Nations Food and Agriculture Organization recommends encouraging the use of food guidelines as essential tools for nutrition education strategies. These should be developed using understandable, ordinary language so as to be suitable for the general public *(33)*. Other experts also highlight the usefulness of food guidelines for achieving a healthy diet *(34–36)* and state that healthy eating can be achieved by applying dietary guidelines *(33)*.

However, dietary guidelines need to be understandable by the target group for their acceptance and use *(11)*. Thus, other reports suggest that the scientific data included in guidelines (e.g. numerical terms, nutrient amounts and energy percentages) should be expressed in everyday language and based on foods familiar to consumers and culturally acceptable *(37)*.

Nevertheless, this study found inconsistencies among Spanish dietary guidelines related to whether they follow the CINDI 12 step recommendations and food specifications for a healthy diet.

There were also important differences in the inclusion (or not) of serving size and how these were quantified: only three of the 18 guidelines included home measures and 15 expressed them either in grams, in litres, or as a percentage of the total daily energy intake, making them difficult to understand for the general public. These factors could strongly affect user compliance with the recommendations.

Users may also have difficulties in determining the appropriate intake of carbohydrate-rich food (bread, cereals, potatoes and/or pasta), which form the main component of every food pyramid, because more than half of the guidelines did not provide sufficient detail in their recommendations: more than half did not quantify intake and those that did had large differences in the recommended amounts, units and daily servings. Consequently, users might be confused and unsure about consuming this food group.

Although an important aim was to raise public awareness of the importance of increasing fruit and vegetable consumption *(38)*, this recommendation was omitted in more than a fifth of guidelines. In 14 out of 18 guidelines, the recommended intake (CINDI step 3) was stated as 400 g/day or as 2–3, 2–4 or 5 generic servings. Based on this variation, the recommended amounts are not likely to be easily understood by consumers. Thus, they do not provide correct guidance to the population. In line with this, Spain's compliance with recommendations for fruit and vegetable consumption is the lowest (along with Iceland) of all countries within the European framework *(39)*.

A recommendation for maintaining an acceptable BMI was included in only one guideline. BMI is a measure that is difficult for the average person to calculate and interpret, and the obesity classification of BMI can vary depending on race, age and other features *(40)*. Although physical activity is important for health maintenance, almost four out of the 18 guidelines analysed failed to recommend this. Those that did include a recommendation for physical activity were variable: some included the CINDI recommendation to exercise every day, without specifying the type or length of time, while others specify different periods of activity, on average 1–1.5 hours a day.

Inconsistencies among the food guidelines analysed were greatest for recommendations on total and saturated fat intake. Health institutions are increasingly concerned about reducing obesity rates in populations *(41)* because increased body weight is associated with noncommunicable diseases such as cancers, along with increased morbidity and mortality caused by cardiovascular disease. The latter are partly mediated by increased blood pressure and cholesterol, decreased high-density lipoprotein cholesterol and an increased risk of diabetes. However, four of the 18 guidelines did not advise on the total fat intake, eight did not advise on saturated fats and more than half did not specify high-fat foods. One stated the maximum cholesterol intake per day, but this parameter would be impossible for the average individuals to understand or incorporate into their daily diet.

Reducing sugar intake is widely recommended for reducing obesity, diabetes and atherosclerosis *(42)*, and reducing salt intake is recommended for preventing hypertension *(43)*. Nevertheless, we found that seven of the 18 guidelines did not include recommendations on sugar intake, and only the PERSEO school lunch guide provided home measures *(20)*. In addition, the WHO Global action plan for the prevention and control of noncommunicable diseases 2013–2020 *(44)* recommends reducing the level of salt/sodium added to food. Despite this, recommendations for salt intake were omitted in 10 guidelines, and only the WHO Food guide *(13)* included home measures to help attain a healthy intake. Thus, it is not surprising that salt consumption continues to be higher than desirable in the Spanish population *(45)*.

Consumption of high-protein foods, which is vital for growth, cell regeneration and muscle development *(46)*, was represented in recommendations for the intake of meat, fish, eggs and legumes in 12 guidelines, although these varied in both the form and amount. Moreover, two guidelines did not mention meat, fish, poultry and legumes, but only eggs, and recommended limiting intake to four or five eggs per week. The variability of advice on the frequency of egg intake advice among guidelines was striking. High egg intake has been advised against as it has been linked to high cholesterol levels. However, recent studies reported no correlation between the amount of cholesterol that patients obtained from egg consumption and their overall cholesterol levels *(47)*. Consequently, such discrepancy among both guidelines and reported research means that individuals are likely to be confused about advice on intake of eggs.

A quarter of the guidelines did not make recommendations about dairy products, while more than half did not specify the need to consume low-fat dairy products to reduce cholesterol intake. In contrast, although recommendations about alcohol intake were included only in a fifth of guidelines, they were unanimous in advising not to exceed two units per day. These consistent guidelines could help users to achieve WHO's objective of reducing the harmful use of alcohol by at least 10% by 2025 *(48)*.

Surprisingly, exclusive breastfeeding for infants was only recommended in a minority of guidelines, despite expert endorsement of its benefits *(49)* and breast milk/feeding being described by WHO as "an unparalleled food, ideal for the growth and development of infants, with many benefits for mothers health" *(50)*.

Likewise, only two guidelines made recommendations on food hygiene, although correct food handling and preservation is

necessary to avoid contamination and prevent disease *(51)*. As stressed by the CINDI dietary guide, food hygiene and safety in the production and consumption of foods are "vital issues" *(27)*.

Failure to include all of the CINDI steps was unrelated to publication date: there was no clear pattern of advice between older and newer guidelines (see Table 1).

This study makes an important contribution to our current knowledge of Spanish dietary guidelines by describing their inconsistencies and disagreements. These issues represent a barrier to achieving a healthy diet for the Spanish population.

The main limitations of this study are that we cannot guarantee that all relevant Spanish guidelines were found and the results might not be generalizable to other countries. However, based on the large sample size and comprehensive analysis, the results could be used to develop more effective guidelines in line with the CINDI 12 step recommendations in Spain. It may also be advisable to conduct similar studies in other European countries.

CONCLUSIONS

This article illustrates the difficulties faced by the Spanish population in learning what a healthy diet means from information provided in dietary guidelines. It is difficult to establish a single, agreed and consistent concept of healthy eating because food recommendations in the different dietary guidelines for Spain are highly variable. Likewise, advice on which specific foods should be eaten or avoided is lacking in many guidelines. Finally, the guidelines provide different advice about food servings related to quantities and units, and disagree on the recommended amounts. Overall, there has been no improvement in inclusion and specification of the 12 CINDI steps over time.

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REFERENCES

1. Lozano R, Naghavi M, Foreman K, Lim S, Shibuya K, Aboyans V et al. Global and regional mortality from 235 causes of death for 20 age groups in 1990 and 2010: a systematic analysis for the Global Burden of Disease Study 2010. Lancet. 2012; 380:2095–128.
2. Murray CJL, Lopez AD. Measuring the global burden of disease. N Engl J Med. 2013; 369:448–57.
3. Hunter DJ, Reddy KS. Noncommunicable diseases. N Engl J Med. 2013; 369(14):1336–43.
4. Requejo AM, Ortega RM. Nutriguía: manual de nutrición clínica en atención primaria [Nutriguide: manual of clinical nutrition in primary care]. Madrid: Editorial Complutense; 2000 (in Spanish).
5. Lopez Nomdedeu C. [Resume of activities in the Program of Education in Diet and Nutrition EDALNU program]. Rev Sanid Hig Publica (Madr). 1973; 47(6):559–78 (in Spanish).
6. Guía de la alimentación saludable [Healthy eating guide]. Madrid: Sociedad Española Nutrición Comunitaria; 2004 (http://www.nutricioncomunitaria.org/es/noticia-documento/19, accessed 23 November 2017; in Spanish).
7. Resolution WHA57.17. Global strategy on diet, physical activity and health. In: Fifty-seventh World Health Assembly, Geneva, 17–22 May 2004. Geneva: World Health Organization; 2004.
8. Estrategia NAOS. Estrategia para la nutrición, actividad física y prevención de la obesidad [NAOS strategy. Strategy for nutrition, physical activity and prevention of obesity]. Madrid: Ministry of Health and Consumer Affairs; 2005 (www.aecosan.msssi.gob.es/AECOSAN/docs/documentos/nutricion/estrategianaos.pdf, accessed 7 October 2014; in Spanish).
9. Alimentación saludable. Guía para familias [Healthy nutrition. Guide for families]. Programa PERSEO. Madrid: Ministry of Health and Consumer Affairs; 2007 (http://www.msssi.gob.es/profesionales/saludPublica/prevPromocion/promocion/saludJovenes/docs/alimentSaludGuiaFamilias_2007.pdf, accessed 19 November 2017; in Spanish).
10. Díaz-Méndez C. Estabilidad y cambio en los hábitos alimentarios de los españoles [Stability and change in eating habits of the Spanish people]. Acta Pediatr Esp. 2016; 74(1):29–34 (in Spanish).
11. Boticario C, Calvo S. [Nutrition and dietetics II: clinical aspects]. Madrid: Universidad Nacional de Educación a Distancia; 2005: 597 (in Spanish).
12. Guía práctica de la alimentación saludable [Practical guide to healthy eating]. Vitoria-Gasteiz, Spain: Departamento Municipal de Salud y Consumo (https://www.vitoria-gasteiz.org/http/wb021/contenidosEstaticos/adjuntos/es/46/64/4664.pdf, accessed 18 March 2015; in Spanish).
13. CINDI dietary guide. Copenhagen: WHO Regional Office for Europe; 2000 (EUR/00/5018028: E70041; http://apps.who.int/iris/handle/10665/108342, accessed 26 November 2017).

14. Guía alimentación saludable en la escuela [Programme for the promotion of healthy eating in school]. Seville: Ministry of Health, Regional Government of Andalusia; 2007 (http://www.juntadeandalucia.es/salud/channels/temas/temas_es/P_4_SALUD_PUBLICA/P_2_PROMOCION_DE_LA_SALUD/Programas_del_Entorno_Escolar/Promocion_Alimentacion_Saludable/prog_alimentacion_saludable?perfil=org&desplegar=/temas_es/P_4_SALUD_PUBLICA/&tema=/temas_es/P_4_SALUD_PUBLICA/P_2_PROMOCION_DE_LA_SALUD/Programas_del_Entorno_Escolar/Promocion_Alimentacion_Saludable/, accessed 16 March 2015; in Spanish).
15. Guía de buena práctica clínica en el consejo dietético [Good clinical practice guidelines on dietary advice]. Madrid: Consejo General de Colegios de Médicos de España; 2005 (http://www.cgcom.es/sites/default/files/guia_consejo_dietetico.pdf, accessed 20 November 2017; in Spanish).
16. Estrategia NAOS [NAOS strategy]. Madrid: Ministry of Health and Consumer Affairs; 2005 (www.aecosan.msssi.gob.es/AECOSAN/docs/documentos/nutricion/estrategianaos.pdf, accessed 7 October 2014; in Spanish).
17. Guía de alimentación y actividad física para escolares [Guide to the diet and physical activity of schoolchildren]. Murcia: Concejalía de Sanidad y Servicios sociales del Ayuntamiento de Murcia; 2007 (in Spanish).
18. Alimentación saludable: guía para las familias [Healthy eating: guide for families]. Oviedo, Spain: Asturias Regional Ministry of Education and Science; 2008 (http://cort.as/jmhh, accessed 23 November 2017; in Spanish).
19. Guía de nutrición y alimentación saludable en el adolescente [Guide to nutrition and healthy eating in adolescents]. Valencia: Department of Health of the City of Valencia; 2008 (http://cort.as/jmgq, accessed 14 March 2014; in Spanish).
20. PERSEO programa. Guía de comedores escolares [PERSEO school lunch guide]. Madrid: Ministry of Health and Consumer Affairs; 2008 (in Spanish).
21. Guía de alimentación saludable. Cuida tu alimentación y la de tu familia [Healthy eating guide. Take care of your diet and that of your family] [Electronic version]. Madrid: Fundación Secretariado Gitano; 2008 (https://gitanos.org/centro_documentacion/publicaciones/fichas/31801.html.es, accessed 21 November 2017; in Spanish).
22. EURRECA project: micronutrient recommendations across Europe. Brussels: International Life Sciences Institute Europe (http://ilsi.eu/eurreca, accessed 19 November 2017).
23. Programa alimentación saludable y actividad física en la infancia y adolescencia Cantabria [Programme of healthy eating and physical activity in childhood and adolescence in Cantabria]. Santander: Ministry of Health, Government of Cantabria; 2010 (http://saludcantabria.es/index.php/programa-alimentacion-saludable-y-actividad-fisica-en-la-infancia-y-adolescencia-cantabria-2, accessed 21 November 2017; in Spanish).
24. Libro blanco de la nutrición en España [White paper on nutrition in Spain]. Madrid: Fundación Española de la Nutrición; 2013 http://www.seedo.es/images/site/documentacionConsenso/Libro_Blanco_Nutricion_Esp-2013.pdf, accessed 21 November 2017; in Spanish).
25. Food-based dietary guidelines in the WHO European Region. Copenhagen: WHO Regional Office for Europe; 2003 (EUR/03/5045414: E79832; www.euro.who.int/__data/assets/pdf_file/0017/150083/E79832.pdf?ua=1, accessed 29 November 2017).
26. Nishida C, Uauy R, Kumanyika S, Shetty P. The joint WHO/FAO expert consultation on diet, nutrition and the prevention of chronic diseases: process, product and policy implications. Public Health Nutr. 2004; 7(1a):245–50.
27. Countrywide Integrated Noncommunicable Diseases Intervention (CINDI) Programme: report of the 23rd annual meeting of CINDI Programme Directors, Banff, Canada, 16-17 October 2006. Copenhagen:WHO Regional Office for Europe; 2007 (EUR/06/5063820).
28. Obesity: preventing and managing the global epidemic: report of a WHO consultation. Geneva: World Health Organization; 2000 (WHO/NUT/NCD/98.1).
29. Michaelsen KF, Weaver L, Branca F, Robertson A. Feeding and nutrition of infants and young children: guidelines for the WHO European Region, with emphasis on former Soviet countries. Copenhagen, WHO Regional Office for Europe, 2000 (WHO Regional Publications, European Series, No. 87).
30. Brázdová Z, Ruprich J, Hrubá D, Petráková A. Dietary guidelines in the Czech Republic III.: challenge for the 3rd millennium. Cent Eur J Public Health. 2001; 9(1):30–4.
31. Aranceta Bartrina J, Serra Majem Ll. Objetivos nutricionales y guías dietéticas [Nutritional objectives and dietary guidelines]. In: Serra Majem Ll, Aranceta Bartrina J, Mataix Verdú J, eds. Nutrición y salud pública: métodos, bases científicas y aplicaciones [Nutrition and public health: methods, scientific bases and applications], 2nd edition. Barcelona: Masson; 2006 (in Spanish).
32. Aranceta J, Pérez C, Serra Ll. Nutrición comunitaria [Community nutrition]. Rev Med Univ Navarra 2006; 50(4):39–45 (in Spanish).
33. Izquierdo Hernández A, Armenteros Borrell M, Lancés Cotilla L, Martín González I. Alimentación saludable [Healthy eating]. Rev Cubana Enfermer. 2004; 20(1):1 (in Spanish).
34. Ríos P. La educación nutricional como factor de protección en los trastornos de la conducta alimentaria [Nutrition education as a protective factor in eating disorders]. Trastornos de la conducta alimentaria. 2009; 10:1069–86 (in Spanish).
35. Velasquez G. Fundamentos de alimentación saludable. Universidad de Antioquia, 2006. ISBN 9586559904.
36. Sastre A, Hernández M. Tratado de nutrición [Treaty of nutrition]. Madrid: Días de Santos; 1999 (in Spanish).

37. Mañas Almendro M, Martínez de Victoria E, Yago Torregrosa MD. Principios generales de nutrición [General principles of nutrition]. In: Márquez Rosa S, Garatachea Vallejo N, eds. Actividad física y salud [Physical activity and health]. Madrid: Díaz de Santos, 2010:405–20 (in Spanish).

38. Dossier 5 al día. Madrid: Asociación para la promoción del consumo de frutas y hortalizas 5 al Día [Association for the promotion of the consumption of fruits and vegetables 5 a Day]. (http://www.5aldia.org/datos/60/DOSSIER_INFORMACION_5_AL_DIA_def11.pdf.pdf, accessed 4 September 2016; in Spanish).

39. Fruit and vegetable consumption in Europe – do Europeans get enough? Brussels: European Food Information Council; 2012 (http://www.eufic.org/en/healthy-living/article/fruit-and-vegetable-consumption-in-europe-do-europeans-get-enough/, accessed 26 November 2017).

40. About adult BMI. Atlanta (GA): Centers for Disease Control and Prevention; 2017 (https://www.cdc.gov/healthyweight/assessing/bmi/adult_bmi/index.html/, accessed 18 November 2017).

41. Lobos JM, Royo-Bordonada MA, Brotons C, Álvarez-Sala L, Armario P, Maiques A et al. Guía Europea de prevención cardiovascular en la práctica clínica. Adaptación Española del CEIPC 2008 [European guidelines on cardiovascular prevention in clinical practice. CEIPC 2008 Spanish adaptation]. Rev Esp Salud Publica. 2008; 82(6):581–616 (in Spanish).

42. Anesto JB. Consumir azúcar con moderación [Consuming sugar in moderation]. Revista Cubana Aliment Nutr. 2002; 16(2):142–5 (in Spanish).

43. Hernández Cisneros F, Mena Lima AM, Rivero Sánchez M, Serrano González A. Hipertensión arterial: comportamiento de su prevalencia y de algunos factores de riesgo [Arterial hypertension: prevalence and risk factors]. Rev Cubana Med Gen Integr. 1996; 12(2):145–9 (in Spanish).

44. Global action plan for the prevention and control of noncommunicable diseases 2013–2020. Geneva: World Health Organization; 2013.

45. Aparicio A, Rodríguez-Rodríguez E, Cuadrado-Soto E, Navia B, López-Sobaler AM, Ortega, RM. Estimation of salt intake assessed by urinary excretion of sodium over 24 h in Spanish subjects aged 7–11 years. Eur J Nutr. 2017; 56(1):171–8.

46. Roselló MJ. La importancia de comer sano y saludable [The importance of healthy eating]. Barcelona: Plaza & Janés; 2011 (in Spanish).

47. Oriondo RL, Bernui I, Valdivieso LR, Estrada E. Relación entre colesterol dietario, consumo de huevo y perfil lipídico en adultos aparentemente sanos, según grupos de edad [Relationship between dietary cholesterol, egg consumption and lipid profile in apparently healthy adults, according to age groups]. An Fac Med. 2013; 74(1):27–30 (in Spanish).

48. NCD global monitoring framework: ensuring progress on noncommunicable diseases in countries. Geneva: World Health Organization; 2014. (http://www. who. int/nmh/global_monitoring_framework/en/, accessed 26 November 2017).

49. Lactancia materna [Breastfeeding]. Asociación Española de Pediatría. (http://www.aeped.es/sites/default/files/documentos/201701-lactancia-materna-mejor-ambos.pdf, accessed 20 November 2017; in Spanish).

50. Exclusive breastfeeding. Geneva: World Health Organization; 2017 (http://www.who.int/nutrition/topics/exclusive_breastfeeding/en/, accessed 20 November 2017).

51. Five keys to safer food manual. World Health Organization. France, 2006. ISBN 9241594632. http://www.who.int/foodsafety/publications/consumer/manual_keys.pdf, accessed 21 November 2017). ■