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The European Journal of Public Health, Vol. 30, No. 2, 346–353

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doi:10.1093/eurpub/ckz139 Advance Access published on 3 August 2019

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A comparison of European countries FBDG in the light of their contribution to tackle diet-related health inequalities

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Background: The purpose of this article is to report on a comparative analysis of the official food-based dietary guidelines (FBDG) that were applicable in 2015 in 25 EU Member States. We assess FBDG in relation to the main guidelines established by the FAO/WHO, the EURODIET project and the EFSA, with a particular focus on identifying strengths and limitations of current FBDG in Europe towards addressing diet-related health inequalities. **Methods:** This is a review research, in which a mixed-methods sequenced procedure was utilized. In each EU country key informants, including sociologists, economists, dietitians and nutritionists were asked to provide data regarding: (i) current dietary guidelines and national health priorities, (ii) model of health promotion currently available, (iii) results of the latest food consumption survey. All documents were reviewed by the coordinating team. Full data were analysed by two nutritionists, using a tabulated sheet to organize and compare the results. **Results:** While all countries have national FBDG, the level of detail and quality varies substantially with regard to: time of last update; availability of recommendations for specific target groups; specification of frequency and portion size; the graphical representation; recommended amounts and limits of foods consumed; and recommendations regarding physical activity. **Conclusions:** European countries have great opportunities to improve FBDG to better serve Public Health policy through a more consistent foundation of how these guidelines are developed, the inclusion of different population subgroups as a target for recommendations and the implementation of monitoring systems.

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Introduction

This article reports a comparative analysis of the food-based dietary guidelines (FBDG) that were applicable in 2015 in 25 EU countries, conducted in the framework of the 'Pilot Project for the development of a common methodology on Reference Budgets in Europe'. The Pilot project was a research study funded by the European Commission's DG Employment, Social Affairs and Inclusion to develop a common methodology to construct high-quality comparable reference budgets (RBs) in all EU Member States. RBs are conceptualized as illustrative priced baskets of goods and services that represent the minimum necessary resources for well-described types of families to have an adequate social participation.¹ In this framework, participating adequately means that people have the essentials to develop their various social roles in a particular society (i.e. being a mother, a worker, a student, a neighbour, a citizen, etc.). Because building RBs requires developing a concrete list of goods and services to fulfil a specific need (here, a suitable diet that allows adequate social participation), our work started from national FBDG as a 'normative' input on what the population from different EU countries is recommended to eat to achieve and/or maintain good health.

FBDG are science-based policy recommendations in the form of guidelines for healthy eating that start from the available scientific knowledge on the most relevant diet-disease relationships for the targeted population and identify dietary patterns that can facilitate the achievement of a diet that better promotes health.² They constitute the closest set of nutritional standards for the population and are primarily intended for consumer information and education. As such, they should be easily understandable, appropriate for the region where they are developed, culturally acceptable and practical to implement.³

Since there exists a strong link between diet and the most prevalent diseases in developed societies, their development and implementation has the potential to heavily influence the burden of disease within its citizenship, to the extent that the quality of such tools may accentuate or blur diet-related health inequalities between and within countries, in such a way that even the causes of mortality and morbidity are mostly common, there is an uneven distribution of conditions and their causes throughout the population.^{2,4-6}

The FAO and WHO published in 1996 a set of recommendations on the development of FBDG that remain a point of reference.⁷ In Europe this work was taken further by the EURODIET project, which proposed an updated framework for the development of FBDG.⁸ Their main recommendations can be summarized in five points: (i) FBDG must start from recognized public health problems; (ii) FBDG are prepared for a particular socioeconomic context and must reflect the particularities of the territory with regard to food availability and consumption patterns; (iii) FBDG should be updated systematically, ideally every 5 years; (iv) FBDG must reflect patterns of consumption, rather than numerical goals in terms of nutrients; and (v) they must be relatively consistent with prevailing patterns of consumption (otherwise they will hardly be accepted).

A sixth point was added by Roth and Knai⁵ in a report issued in 2003 by the WHO Regional Office for Europe, concerning the need for government endorsement of FBDG to further articulate health policies coherent with dietary recommendations. At that moment, only 25 of the 48 countries participating in the study reported having national, government-endorsed FBDG.

In 2009, the European Food Information Council (EUFIC) published on its website a review of FBDG available in Europe at that moment. Thirty EU countries FBDG's were reviewed through an analysis of the graphic format, number of food groups or food messages, availability of support information (quantitative or qualitative), specification of fluid, salt and specific micronutrient recommendations and presence of advice on other lifestyle behaviours.⁹

This analysis was eminently descriptive and did not present any conclusions regarding the 'status of affairs' of European FBDG. The EU-funded project EURRECA¹⁰ did undertake this endeavour, concluding that it was not possible to determine the effectiveness of FBDG due to a lack of systematized monitoring. Among the major drawbacks, the authors highlighted the absence of data about consumer awareness and understanding of the FBDG, as well as about the assessment of their impact in terms of changes in food purchase, intake or disease patterns.¹⁰ In 2015, Montagnese et al.¹¹ published a review of the FBDG current in 2012 in 34 European countries, which focused on their pictorial representations, food groupings and associated messages of healthy eating and behaviour. Their conclusions pointed out that FBDG still seemed insufficient as far as ethnic peculiarities, agreement on how to group foods, and subgroup population nutritional requirements were concerned. In a global perspective, Herforth et al.¹² performed a review of FBDG available for 90 countries worldwide, comparing their main elements to the WHO recommendations on healthy diet.¹³ Their analysis showed that most FBDG messages were aligned with WHO recommendations, but that attention to environmental sustainability and sociocultural factors—including rapidly changing dietary trends—still had to be further developed.

Taking the considerations made in the previous paragraphs as our starting point, the purpose of our article is to report on a comparative analysis of the official FBDG that were applicable in 2015 in 25 EU Member States, with a particular focus on how EU FBDG address diet-related health inequalities.

Methods

A mixed-methods sequenced procedure was utilized, in the framework of a wider study to construct cross-country comparable food budgets.^{1,14,15} The collection of the necessary information was done in collaboration with key informants in every country, using a methodology similar to the one applied by the FAO in the elaboration of the report 'The state of Food-based Dietary Guidelines in Latin America and the Caribbean'.¹⁶ Key informants were 'national pairs' formed by experts on poverty and a dietitian or nutritionist familiar with public health nutrition. This pairing pursued the consideration of both the nutritional and social dimensions of eating in the development of minimum food baskets.

Given that FBDG should start from recognized diet-related public health problems, we collected information on the food consumption and health situation in each country.^{7,8} The diet-related health situation in each country was retrieved through the WHO non-communicable diseases country profiles 2014.

No comparable data on food groups consumption exists in Europe, despite the efforts made by the EFSA in creating the EFSA Comprehensive European Food Consumption Database. Therefore, circumstance diet-related public health situation and food consumption data for every country was obtained from different non completely comparable sources and is provided in the Supplementary table S1.

FBDG-related data were collected using a tabulated sheet.¹⁴ Table 1 offers a synthesis of the different aspects of the FBDG available in each country, namely: institution and year of publication, governmental support, population groups for which the guidelines have been drawn, graphic illustration, availability of food frequencies and portion amount, physical activity recommendation and other observations.

Results

We received information about all countries except for EE, NL and SK, so our total sample comprised 25 EU countries. FBDG issue dates range from 1990 (MT) to 2014 (FI). One third of the FBDG had not been updated in the last 10 years, while an update is recommended

Table 1 Description of FBDG available in the different EU countries

| Institution | Year | Government-supported in the frame of a nutrition-related policy | AGES for which the guidelines have been developed | Graphic illustration (if any: pyramid, wheel, others; levels and groups included) | Different age groups, frequencies, portion amount available | Physical activity recommendation | Other observations |
|--|---|---|--|---|--|---|--------------------|
| AT Federal Minister for Health advised by National Commission on Nutrition (NEK) | 2010 | Yes | Adult population Specific recommendations for children, youth and elderly | Pyramid 7 levels Low-calorie beverages and fruits and legumes at the base | Information about frequencies and portion amount for the different age groups are included | 60 min/day for children 150 min/week for adults | |
| BE The Superior Health Council—Federal Public Service for Health, Food Chain Safety and Environment | 2009 (currently being updated) | Yes | Adult population Specific recommendations for children, youth and elderly | Pyramid 7 levels Water and wholegrain cereals at the base | Information about frequencies and portion amount for the different age groups are included | 60 min/day for youth 30 min/day for adults and elderly | |
| BG Ministry of Health | 2005 | Yes | Currently no FBDG in terms of amounts/freq/age groups | Pyramid 4 levels Fruit and vegetables and starches at the base | Information about frequencies and portion amount for the different age groups are included | Mentioned as a part of BG National Program, but no minimum quantity suggested | |
| CY Nutrition Committee from the Ministry of Health | 6- to 12-year-old (2009) 12- to 18-year-old (2011) 18- to 65-year-old (2007) >65-year-old (2012) | Yes | Adult population Specific recommendations for children, youth and elderly | Pyramid 4 levels Starches at the base | Information about frequencies and portion amount for the different age groups are included | 30–60 min/day | |
| CZ Society for Nutrition | 2012 | No | Adult population Specific recommendations for children, youth, elderly and pregnant women | Pyramid 4 levels Fruit and vegetables at the base | Amounts not clear (recommendations in number of portions per day or week, but without indication of portion size) | Not mentioned | |
| DE German Nutrition Society (as a part of the DACH region Nutrition Society) | 2013 | No, but endorsed by the German government | Adult population Specific recommendations for children, youth and elderly | Circle+three-dimensional pyramid Non-defined levels (although a hierarchy of groups is shown) Fruits and vegetables at the base | Information about frequencies and portion amount for the different age groups are included | Recommendation of being physically active, but no minimum quantity suggested | |
| DK Ministry of health based on the Nordic Nutrient Recommendations | 2012 | Yes | General population | Graphic illustrations with 9 recommendations | Recommendations are generic, but specific material exists for different age groups. No info about frequencies and portion amount | Recommendation of being physically active, but no minimum quantity suggested | |
| EL Supreme Scientific Health Council at the Greek Ministry of Health | 1999 | Yes | Adult population | Pyramid 11 levels Wholegrain products at the base | Yes, but only for adults; and they have not been update since 1999 | 15–30 min/day | |

(continued)

Table 1 Continued

| Institution | Year | Government-supported in the frame of a nutrition-related policy | AGES for which the guidelines have been developed | Graphic illustration (if any: pyramid, wheel, others; levels and groups included) | Different age groups, frequencies, portion amount available | Physical activity recommendation | Other observations |
|--|---|---|--|---|---|---|---|
| ES SENC, 2004 for adults PERSEO, 2008 for children | Adults 2004 (currently being updated) Children 2006 | No, but endorsed by the Spanish government | Adult population Specific recommendations for children and youth | Pyramid 6 levels Starches at the base | Different age groups, frequencies, portion amount No specific recommenda- tions for elderly | 30 min/day for adults 60–90 min/day children | |
| FI The Finnish National Nutrition Council, 2014 | 2014 | Yes | Adult population | Pyramid 6 levels Fruit and vegetables at the base Plate Half of the plate as vegetables | Frequencies and portion amount available for adults | 60 min/day children 150 min/week adults | Vitamin D pills are included in the FBDG recommendations |
| FR Study Group of the Markets of Institutional Catering and Nutrition, 2013 | 2013 | Yes | Adult population Specific recommendations for children, youth, elderly and pregnant women | Graphic illustrations with 9 recommenda- tions (1 for physical activity) | Information about frequencies and portion amount for the different age groups are included | 30 min/day for adults 60–90 min/day children | |
| HR Ministry of Health— population 2011—elderly 2013—children Croatian Medical Association—elderly Ministry of Health— children | 2002—adult/general population 2011—elderly 2013—children | Yes | Adult population Specific recommendations for children, youth and elderly | Pyramid 4 levels Grains at the base | No indications of portion amount, except for the case of children | Recommendation of being physically active, but no minimum quantity suggested | |
| HU National Institute of Food Hygiene and Nutrition | 1987 | No, but endorsed by the Hungarian government | General population | House of the Healthy nutrition Wholegrains at the base | Guidelines include informa- tion about frequencies for the different age groups, but not about portion amount | Recommendation of being physically active, but no minimum quantity suggested | |
| IE Food Safety Authority of Ireland, at the request of the Department of Health and Children | 2012 | Yes | Adult population Specific recommendations for children, youth and elderly | Pyramid 6 levels Wholegrains at the base | Information about frequencies and portion amount for the different age groups are included | Not mentioned | Vitamin D and calcium supplementation is included in the FBDG recommendations |
| IT The National Research Institute for Food and Nutrition | 2003 | Yes | Adult population Specific recommendations for children, youth and elderly | Graphic illustrations with 10 recommendations (1 for physical activity) | Information about frequencies and portion amount for the different age groups are included | Recommendation of being physically active, with at least 20 min/day of intense physical activity | |
| LT The Health Education and Disease Prevention Centre, Faculty of Medicine of the Vilnius University, Kaunas University of Medicine | 2010 | No | Adult, children and youth population | Pyramid 3 levels Fruits, vegetables and starches at the base | Only for adults. For children the food pyramid is available, but without indication of portion sizes | 30 min/day for adults | |

(continued)

Table 1 Continued

| | Institution | Year | Government-supported in the frame of a nutrition-related policy | AGES for which the guidelines have been developed | Graphic illustration (if any: pyramid, wheel, others; levels and groups included) | Different age groups, frequencies, portion amount available | Physical activity recommendation | Other observations |
|----|--|------|---|--|---|---|--|--------------------|
| LU | Ministry of Health | 2009 | Yes | Adult population Specific recommendations for children, youth and elderly | Pyramid 6 levels Water, fruits and vegetables at the base | The guidelines include information about frequencies and portion amount for the different age groups | 30 min/day for adults 60 min/day for children | |
| LV | Ministry of Welfare | 2008 | Yes | Adult population Specific recommendations for children, youth and elderly | Pyramid 4 levels Starches at the base | The guidelines include information about frequencies and portion amount for the different age groups | 30 min/day for adults 60–90 min/day for children | |
| MT | Malta Food and Nutrition Policy, Department of Health | 1990 | Yes | Adult population | Pyramid 4 levels Starches at the base | The frequencies and amounts have been compiled from different sources | 75–150 min/week for adults 60 min/day for children | |
| PL | National Food and Nutrition Institute endorsed by the Minister of Health | 2009 | Yes | Adult population Specific recommendations for children, youth and elderly | Pyramid 6 levels Starches at the base | The guidelines include information about frequencies and portion amount for the different age groups | 45–60 min/day | |
| PT | National Program for the Promotion of Healthy Eating | 2003 | Yes | Adult population Specific recommendations for children, youth and elderly | Wheel 7 groups Starches as the biggest | The guidelines include information about frequencies and portion amount for the different age groups | Not mentioned | |
| RO | Romanian Society of Nutrition | 2006 | Yes | Adult population | Pyramid 6 levels Starches at the base | The guidelines include information about frequencies and portion amount for adults (except for fish) | No specific guidelines included in the FBDS, but national recommendation is 30 min/day | |
| SE | Swedish National Food Agency | 2012 | Yes | Adult population | Wheel 7 groups All equally distributed | Information regarding portion amounts and frequencies of consumption of the different food groups for adults is included in a supplementary document entitled 'Swedish Nutrition Recommendations Objectified' | Not specified, although it is mentioned that increasing physical activity is a priority of the national health promotion model | |
| SI | National Assembly of the Republic of Slovenia | 2005 | Yes | Adult population Specific recommendations for children, youth and elderly | Pyramid 6 levels Water, Fruits and vegetables at the base | The guidelines include information about frequencies and portion amount for the different age groups | 150 min/week for adults | |
| UK | Scientific Advisory Committee on Nutrition | 2011 | Yes | Adult population | Wheel 5 groups Grains, fruits and vegetables occupy the biggest segment | The guidelines include information about frequencies and portion amount for adults | Not mentioned | |

every 5 years.⁸ Most FBDG are issued by national governments. CZ, LT, DE, ES and HU are the exceptions, although for the latter three countries an explicit governmental support has been reported.

Some countries formulate conjunct recommendations, such as the DACH region (DE, AT, CH), whose guidelines also influence the Czech and Slovenian dietary recommendations; or the Nordic Nutrition Recommendations used in DK, FI, SE, IS and NO.

FBDG are initially developed for the adult population, but because dietary needs change by age, gender and by physiological state (i.e. pregnancy), it is recommended that guidelines adapted to these groups are also provided.³ Most countries follow this recommendation, although in some cases these are provided by different institutions (ES and HR). Only BG, CZ, FI, HU, MT, RO, SE and UK do not have specific recommendations for different age groups.

The main difference in the approach used to communicate FBDG concerns whether or not a portion size is clearly indicated along with the recommended frequency of consumption, as in the case of AT, BE, CY, FI, FR, DE, EL, IT, LV, LT, LU, PT, RO, SI, ES, UK, and only for adults in LT and RO. In HR, CZ, IE, MT and SE only the frequency of consumption of the different food groups is clearly indicated, without specifying the portion sizes.

In most countries, FBDG include a specific graph to summarize and explain the FBDG. Food pyramids (AT, BE, BG, HZ, CY, CZ, FI, EL, LV, LT, LU, PL, RO, SI and ES) are the most frequent representation, although in some countries a wheel-shaped format (DE and SE), a plate format (FI) or another format is used, such as the Hungarian 'House of Healthy Nutrition' Italy does not use a graphic representation in their FBDG. The number of levels or groups included in the graphic representation is also diverse, ranging from three in LT or four in BG, CY, CZ, HR, LV, MT and seven in AT, BE, PT. The French (nine levels) and Greek (11 levels) graphic representation present the greater number of separated levels. All other countries with a graphic illustration present five or six levels. In the SE wheel, all groups appear to be equally represented.

Geographical patterns can be identified regarding the content of the FBDG. For example, the dietary recommendation for protein-based foods such as meat or fish is of one portion per day (average 100–125 g) in western countries such as BE, AT or DE, while this amount is twice as much in the Eastern and Mediterranean countries. This geographical pattern can also be observed in the case of fats, with a much higher recommendation in the Mediterranean countries (up to six table spoons of olive oil in Spain, 40 g in Italy), probably because the main sources of fat recommended in these countries are olive oil and nuts, which are known for their beneficial effects on health.^{17,18} This contrasts with most of the other countries, in which butter and other spreadable fats are the most frequent type of fat.

Some countries provide a single recommendation for fruit and vegetables (IE, SE, DE, SI and LV), while other differentiate between both groups (EL, IT, LU, ES, CZ, PO and LT). The amount differs between countries, too. For example, the total recommended amount of fruits and vegetables for an adult per day in LV is 400 g, while in Portugal this is 600 g of vegetables and four fruit portions per day.

The recommendation to restrict salt intake exists in almost every country, either in the form of maximum amounts or as an advice to reduce its intake in the qualitative guidelines. Only CZ, LT and PT did not mention salt consumption in their guidelines.

The way in which European countries incorporate recommendations regarding alcohol consumption in their FBDG acquires three main forms: first, we find countries that do not mention alcohol consumption in their healthy eating guidelines, probably because they do not consider that alcohol should be part of it. This is the case of AT, BE, CZ, DE, EL, IE, LT, LU, RO, SE and SI. Second, other countries such as BG, FI, HU and PL include the advice to reduce or avoid alcoholic beverages consumption. Last, we find countries that include a specific recommendation of a maximum daily or weekly amount within their guidelines, as CY, ES, HR, IT, LV or UK do; most likely with the intention to consider their

population habits and more focused on the 'harmful use' part of the WHO recommendation.

Some FBDG also include general messages such as the recommendation of taking vitamin D pills (IE and FI) or other types of advice that can support a healthy diet and lifestyle (e.g. being active, maintaining emotional balance or slow cooking).

Discussion

Eighteen years ago, the EURODIET project published its final results, part of which dealt with the development and implementation of FBDG.^{4,8} Since then, several studies have reported on the situation of FBDG in Europe.^{5,9–12} Except for Greece, Hungary and Malta, all FBDG in our sample have been developed after the publication of most of these references (excluding the review by Montagnese et al. and Herforth et al., whose data collection was carried out in 2012 and 2017–2018, respectively). (Since data collection, some countries have revised their FBDG, e.g. Belgium or Spain. However, we are convinced this does not affect the overall conclusions that we point out in this discussion.)

The present review adds to the field of study in three different ways: (i) it provides an opportunity to follow up on the state of the affairs of FBDG in Europe, by examining to what extent previous conclusions have been incorporated into newly developed or updated FBDG; (ii) because this review was part of a research in which FBDG were translated into daily, weekly and monthly menus and shopping lists, it assesses the facility of translation of the different messages in the FBDG to actual intakes for various types of individuals (children, adults, males, females, etc.), which is more in line with how citizens might make use of the FBDG; (iii) because this review was part of a research in which poverty and socioeconomic inequalities are central, it examines the potential contribution of current FBDG to the narrowing of diet-related health inequalities.

By exploring these issues from a comprehensive perspective, in what follows we discuss strengths and limitations of the FBDG available in Europe, especially with regard to contributing to a better adjustment of European FBDG as a policy tool to improve health and tackle diet-related inequalities.

The first point refers to the foundation, origin and justification of FBDG. Among FBDG in our sample, it is difficult to establish whether decisions on their development have been mainly based upon epidemiological data about disease distribution, food consumption patterns or even cultural norms and habits. As noted in previous works,^{11,12} the differences identified among the 25 EU countries' FBDG appear to be more related to communication aspects (number of groups, graphical representation, etc.) than to content ones. The fact that the different FBDG do not provide a rationale about the specific link between the country epidemiological situation, its relationship with food consumption, cultural norms and habits and food recommendations, hinders the understanding of this point.

The second point deals with the contextualization and targeting of FBDG. One of the strongest recommendations in Sjostrom and Stockley's paper was that of appropriately approaching the most vulnerable target groups, so to reach those with increased risk factors and leverage (or at least not contribute to) health inequalities. As the authors—and other cited references—describe, it can be done either through the promotion of the FBDG themselves, or through a broader strategy starting from these recommendations.^{4,5,10} In the first case, countries have great opportunities to develop more concrete guidelines by including specific detailed frequency and portion amount recommendations for different age groups and, in some cases, also differentiating by gender. Targeting low cost foods would also be an appropriate tool, since the promotion of expensive foods to low-income people without taking into account the high cost of these products has proved unsuccessful.^{19,20} Providing separate recommendations for different population subgroups is a key element^{7,8,21} with which most of the reviewed FBDG in this

article do not fully comply. A first step in doing so could comprise the adaptation of the recommended food frequencies and amounts, not available in half of our sample. Further variations would come, by exploring the relation between foods, food patterns and nutrient intakes in the different targeted subgroups.^{2,3}

Regarding the development of broader strategies that, starting from FBDG, involve different groups, settings and approaches to promote healthy nutrition, a key factor is government involvement/endorsement of the FBDG, as also anticipated by Roth and Knai.^{4,5} In our sample, not all recommendations have been issued by the Health Ministry or equivalent institution; instead, scientific societies have authored many of these documents. In practical terms, it means that the actions driven by different institutions may not be consistent nor coordinated, duplicating efforts and resources and leaving blank spots.^{22,23}

While a graphic illustration of FBDG makes them more user-friendly and easier to understand, the number and composition of the different groups/levels can sometimes be confusing or uninformative, as different criteria to group food items can be adopted: nutrient content, preferability, food origin, etc. We also noticed that concrete sets of recommendations, sufficiently varied and detailed by target group facilitate the translation of these guidelines into 'low-cost but healthy food baskets' or illustrative menus that are easier to understand by the broader public, and can be an important tool for dietary education—especially among groups with low incomes or education, and also a policy tool for supporting and stimulating access to healthy diets at an affordable cost. Since an increased consumption of processed foods has been identified as a leading cause for most NCDs,^{24,25} we agree with Herford et al. that FBDG should contain messages in this direction, too—especially given the social gradient in the consumption of processed foods.^{26–28} Countries like Brazil have already incorporated the NOVA food classification²⁹ as an axis to enable a new way of thinking about meals and foods, on the strengthening of sociocultural dimensions of feeding, and on addressing food and nutritional guidelines on culinary practices, eating and edibility, thus increasing its potential impact.³⁰ This system provides a framework to consider food products depending on their level of processing and nutritional profile, which may be very useful in dietary education in a globalized market where, for instance, 'a yogurt' can have so many nutritional translations, depending on its composition. The evaluation of both, traditional and new forms of FBDG remains a continuous task.

While keeping in mind the limitations of this study (such as the lack of systematic/single source data in some areas as well as the multiplicity of stakeholders involved in data collection—which can enrich the work but also generate internal variations), the considerable cross-national variation in the quality of FBDG is quite remarkable. Yet, some general recommendations can be formulated, which are consistent with the conclusions of previous studies, indicating that little advancement on the topic has been made in the last two decades. First, to strengthen the theoretical and empirical basis upon which FBDG are built, by considering (and making explicit) data about the relation between diet-related diseases epidemiology, food consumption and nutrient intakes. In this regard, the development and implementation of a comparable food intake survey in Europe would be an important asset to stimulate a joint EU policy,^{31–33} while facilitating comparative research and policy evaluation. Second, to include specific recommendations for different groups, based on age, sex, socioeconomic or ethnic characteristics, among others. Third, to evaluate in an evidence-based way the implementation of FBDG and their graphic representation with the aim of selecting the best possible method. Fourth, to be consistent with the latest state of scientific research on what constitutes a healthy diet through regular, evidence-based, updates of FBDG. And last, to develop FBDG within a broader set of public health and social policy tools.

Country abbreviations (following EU terminology)

AT, Austria; BE, Belgium; BG, Bulgaria; CY, Cyprus; CZ, Czech Republic; DE, Germany; DK, Denmark; EE, Estonia; EL, Greece; ES, Spain; FI, Finland; FR, France; HR, Croatia; HU, Hungary; IE, Ireland; IT, Italy; LT, Lithuania; LU, Luxembourg; LV, Latvia; MT, Malta; NL, Netherlands; PL, Poland; PT, Portugal; RO, Romania; SE, Sweden; SK, Slovakia; SI, Slovenia; UK, United Kingdom.
CH, Switzerland; IS, Iceland; NO, Norway.

Supplementary data

Supplementary data are available at *EURPUB* online.

Acknowledgements

The authors are grateful to all national experts and dietitians and nutritionists who have contributed to this research.

Funding

This article is part of the 'Pilot Project for the development of a common methodology on Reference Budgets in Europe', funded by the European Commission DG Employment, Social Affairs and Inclusion (VC/2013/0554).

Conflicts of interest: None declared.

Key points

- While all countries hold national food-based dietary guidelines (FBDG), the level of detail and quality is different across them.
- Specification of frequency and portion size for specific target groups (physiologically and socially) is not enough developed in most FBDG.
- FBDG can better serve Public Health policy through a more consistent foundation of how these guidelines are developed.
- The implementation of monitoring systems to evaluate its effectiveness is lacking.

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The European Journal of Public Health, Vol. 30, No. 2, 353–357

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doi:10.1093/eurpub/ckz231 Advance Access published on 31 December 2019

Pilot evaluation of an interactive multimedia platform to provide nutrition education to Portuguese adolescents

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Background: Obesity prevalence has been rising worldwide and currently is one of the most serious public health problems. Nutrition literacy is important to the development of healthier habits that could help prevent and stem obesity and overweight. The aim of this study was to evaluate the impact of using a multimedia web platform to provide nutrition education to Portuguese adolescents. **Methods:** The intervention consisted in a two-week period in which students ($n = 1291$) had access to an interactive multimedia web platform with nutritional content, and designed for a self-paced learning experience. Students completed a knowledge questionnaire at baseline and immediately after the end of the intervention. **Results:** The results obtained revealed that 85.8% of the students increased their nutrition knowledge. No gender differences were observed post-intervention. There were significant differences in the knowledge acquisition regarding age ($P < 0.001$). The baseline knowledge seemed to influence the learning process. **Conclusions:** Overall, the intervention had a positive impact. The preliminary results observed will be important for the improvement of the intervention, though they need to be confirmed by further research. Nevertheless, it is safe to say that technology-based assets can be important tools to incorporate and complement health-related interventions in schools.

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