



OPEN ACCESS

EDITED BY

Pauline Douglas,
Ulster University, United Kingdom

REVIEWED BY

Sonia Venancio,
Health Institute, Brazil
Cecilia Castillo,
Nutriologa Infantil, Chile

*CORRESPONDENCE

Natacha Toral
natachatoral@unb.br

†These authors have contributed
equally to this work

SPECIALTY SECTION

This article was submitted to
Public Health Policy,
a section of the journal
Frontiers in Public Health

RECEIVED 31 August 2022

ACCEPTED 01 November 2022

PUBLISHED 02 December 2022

CITATION

Corrêa Rezende JL, de Medeiros
Frazão Duarte MC, Melo GRdAe,
Santos LCd and Toral N (2022)
Food-based dietary guidelines for
children and adolescents.
Front. Public Health 10:1033580.
doi: 10.3389/fpubh.2022.1033580

COPYRIGHT

© 2022 Corrêa Rezende, de Medeiros
Frazão Duarte, Melo, Santos and Toral.
This is an open-access article
distributed under the terms of the
[Creative Commons Attribution License
\(CC BY\)](https://creativecommons.org/licenses/by/4.0/). The use, distribution or
reproduction in other forums is
permitted, provided the original
author(s) and the copyright owner(s)
are credited and that the original
publication in this journal is cited, in
accordance with accepted academic
practice. No use, distribution or
reproduction is permitted which does
not comply with these terms.

Food-based dietary guidelines for children and adolescents

Júlia Laura Corrêa Rezende^{1†},
Maria Carolina de Medeiros Frazão Duarte^{1†},
Giselle Rhaisa do Amaral e Melo¹, Luana Caroline dos Santos²
and Natacha Toral^{1*}

¹Nutrition Department, University of Brasília, Brasília, Brazil, ²Nutrition Department, Federal University of Minas Gerais, Belo Horizonte, Brazil

Objective: This study aimed at reviewing food-based dietary guidelines (FBDGs) with content targeted at children and adolescents to present their main characteristics, thus enabling comparisons among countries.

Design: We conducted a search of the FBDGs available on the Food and Agriculture Organization (FAO) website, followed by a scoping review with a gray literature search to find FBDGs for children or adolescents non-listed on the FAO's website. Data extraction included the year of publication, language, and guidelines for the target group.

Results: From FAO website searches, 109 documents were found, and 17 of them could not be translated. The Scoping review search conducted in 5,190 articles, and none led to new guidelines, nor from the gray literature. Regarding the 92 FBDGs explored, 41 were specific for infants under 24 months old, children, and/or adolescents, and 51 were for the general population with information for the studied group. Twelve percent of the general FBDG and 35% of the specific ones have food icons. All of the guidelines were published after 2001. Latin America and the Caribbean were the regions that presented more specific FBDGs and the majority of countries with guidelines for fruits and vegetables. The information about fat (15 countries) and sugar (26 countries) consumption reduction is frequent. Reduction of sodium intake appears to be in the majority of guidelines after 2015. Food hygiene guidelines are recurrent in Latin American documents. NOVA classification was adopted in five countries and 21 countries approach recommendations for mealtimes. Both exclusive and continued breastfeeding guidance and healthy complementary feeding orientation are present in over 50% of the specific FBDG for infants and children under 24 months old.

Conclusion: Food-based dietary guidelines are diverse due to both the nutritional and political aspects of each region. Latin America stands out for its orientations for the studied group. Further studies should measure the possible impacts and comprehension of FBDGs.

KEYWORDS

adolescent, child, health promotion, dietary recommendations, scoping review

Introduction

Food-based dietary guidelines (FBDGs) are a practical tool for building a more conscious diet based on healthy and sustainable habits since they provide advice on foods, food groups, and dietary patterns to promote overall health, foster healthy eating habits and lifestyles and prevent chronic diseases (1, 2). They can effectively assist the general population, health professionals, and policymakers in different areas, such as nutrition in public health, agriculture, and nutrition education (2). However, the ways in which these guidelines are presented are diverse, varying between countries and according to the stages of life they are targeted (3, 4).

Specific FBDGs for each stage of life are necessary due to the individualities they present. A healthy eating pattern for each stage of life can demand different habits, which should lead to different dietary guidelines (5). The 1st years of life, especially from 0 to 2 years old, are considered an important window of opportunity as it comprises the formation of eating behavior that will be maintained in adulthood (6). In addition, adolescence has particular characteristics, involving elements of biological growth and major social role transitions, that affect eating patterns in this stage of life (7).

Horta et al. have already conducted a review of FBDGs aimed at children and adolescents (8); however, it is outdated, since it was conducted in 2010. Recently, two systematic reviews compared FBDGs for adults (9, 10), but no other studies focusing on children and adolescents were found.

Thus, this study aimed at reviewing the FBDGs with content targeted at children and adolescents around the world, providing information to policymakers on their main characteristics, in order to enable and assist improvements in the country's tool and comparison among countries.

Methods

This study was divided into two parts. The first one corresponds to a search conducted on the Food and Agriculture Organization (FAO) website (11): <https://www.fao.org/nutrition/education/food-based-dietary-guidelines>,—in order to explore the FBDG repository available. This website was launched in 2014 and it has been continually updated. It collates information about FBDG from many countries, including the official name of the national guidelines; publication year; a description of the process and stakeholders involved in its development; the intended audience; a brief description of the food guide; and its key messages. Links to downloadable documents are available too, which were the object of this first part of our study. All FBDGs available were considered, independent of the version, as a complete FBDG, folder, or food guide.

“Food guide” and FBDG were considered synonymous. The information was sought not only in materials specifically for children and adolescents but also in those directed to the general population.

Two reviewers (1R and 2R) were responsible for the extraction of FBDG with information for the intended group on FAO's website. In case there was no information for children and adolescents, the material was excluded. For documents whose existence was indicated in FAO's website, but were not available, when there was an indication of the existence of a more recent version of the material in the website, and/or when an earlier FBDG was from previous knowledge of 1R and 2R, a search in official government pages of the respective countries was done. This phase lasted from February 2021 up to March 2021 and it was updated in July 2022 up to August 2022. Guidelines in English, Spanish, Portuguese, French, German, Italian, Chinese, Korean, and Japanese were translated and their information was extracted.

A table used for the extraction of FBDG found on FAO's website was designed based on previous studies (8–10). Information registered of each material found was: whether it was specific or not for children and/or adolescents, country of origin, region (Latin America and the Caribbean, Europe, Asia and the Pacific, North America, Africa, and Near East), language, year of publication, the age group for which the information was intended (infants and children under 24 months old, named group 1; preschoolers and school-age children between 25 months old and 9 years old, named group 2; and adolescents from 10 to 19 years old, named group 3), intended audience (e.g., general population and health professionals), disposition of information in the general FGDs (e.g., in a specific chapter or annex), and the content directed to the age group. Regarding the content, variables registered were about the presence of a food icon, food groups and/or portion recommendations, recommendations for mealtimes/commensality (e.g., encourages involving the child in preparing meals or eating with the child), and other relevant recommendations, such as fruits and vegetable guidelines, NOVA food classification system, hygiene guidelines, healthy complementary feeding guidelines, recommendation to avoid sugary foods and sweets, fats related information (to limit consumption or about the adequate sources), water ingest, sodium/salt limitation, exclusive breastfeeding, and continued breastfeeding.

NOVA classifies foods into four groups, according to the extent and purpose of the industrial processing they undergo: (1) minimally processed foods and unprocessed food (no addition of salt, sugar, oils or fats, or other food substances to the original food); (2) processed culinary ingredients (like oils and fats, sugar, and salt); (3) processed foods (industrial products made by adding culinary ingredients to the first groups of foods, to increase their durability or enhancing their sensory qualities);

TABLE 1 Search strategy for PubMed database.

Database	Search strategy
PubMed	<p>Infant OR Infants OR Baby OR Babies OR “Preschool child” OR “Preschool children” OR Newborn OR Newborns OR “Young child” OR “Young children” OR Child OR Children OR Kid OR Kids OR Toddler OR Toddlers OR “School child” OR “School children” OR Adolescent OR Adolescents OR teenager OR teenagers OR Teen OR Teens OR Adolescence OR Infante OR Infantes OR Niño OR Niños OR Chico OR Chicos OR Bebê OR Escolares OR “Recién nacido” OR “Recién nacidos” OR Adolescente OR Adolescentes OR Criança OR Crianças OR Bebê OR Bebês OR “Pré escolar” OR “Pré escolares” OR “Recém nascido” OR “Recém nascidos” OR Escolar OR Escolares OR Adolescência. AND “Food based dietary guidelines” OR “Food based dietary guideline” OR FBDG OR “Food guide” OR “Food guides” OR “Nutrition Guidelines” OR “Nutrition Guideline” OR “Nutrition policy” OR “Nutrition policies” OR “Nutritional requirement” OR “Nutritional requirements” OR “Nutritional education” OR “Guías alimentarias” OR “Orientación nutricional” OR “Educación nutricional” OR “Necesidades nutricionales” OR “Política nutricional” OR “Necessidades nutricionais” OR “Educação nutricional.”</p>

and (4) ultra-processed foods (formulations of ingredients, most of exclusive industrial use, which result from a series of industrial processes; products are usually highly profitable, convenient, and hyper-palatable) (12).

The second part of the study corresponds to an additional search in databases following the guidelines of a scoping review in order to check FBDGs for children or adolescents not found on the FAO’s website. A scoping review seems to be a more effective way to identify the types of available evidence in a given field (13). This scoping review was written according to the PRISMA-ScR (Preferred Reporting Items for Systematic reviews and Meta-Analyses extension for Scoping Reviews) checklist (14), and the protocol registration is available online under DOI registration, 10.17605/OSF.IO/J5Z6R (15).

A scoping review aiming to identify scientific articles that mentioned FBDGs non-listed in FAO’s website for children or adolescents (groups 1, 2, and/or 3) was conducted in March 2021 by two reviewers (1R and 2R). We searched for articles that mentioned guidelines for children and adolescents or the general population with information for children and adolescents, but articles that mentioned FBDGs already identified on FAO’s page were not included. Searches were conducted in the following databases: Lilacs, Scielo, PubMed, and Web of Science. This search was complemented by gray literature from Google Scholar (first 100 results). The primary search strategy adopted for the PubMed database (Table 1) was adapted for the other ones. Articles could be in English, Spanish, or

Portuguese, without a limit of the year of publication. The risk of bias was not performed since the aim of the study was not to evaluate the included articles. For the entire selection process, the app Rayyan was used (16). If there was a new FGDB identified, the data extraction would be the same as described before.

The materials will be described in a narrative form and with data organized in tables, with no intention of qualifying them.

Results

As presented in Figure 1, from the FAO’s page extraction, 274 documents were found, of which 109 had information for children and adolescents. Of them, 17 could not be translated. Regarding the 92 FBDGs explored, 41 (17–57) were specific for children and/or adolescents, and 51 (58–108) were directed to the general population with information targeted at children and/or adolescents.

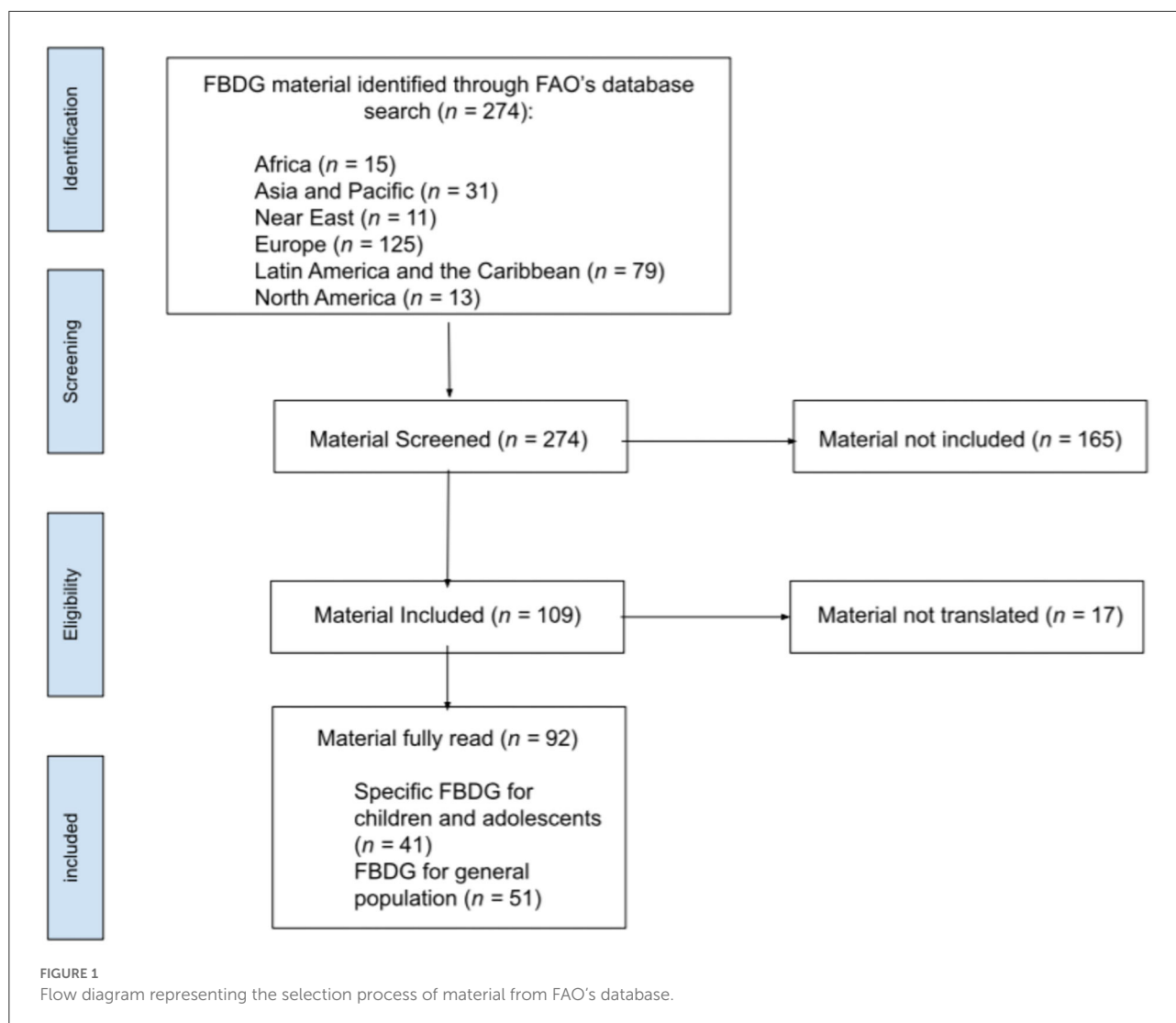
As shown in Figure 2, the search for the systematic review resulted in a total of 5,190 articles, of which 700 were duplicates. After the analysis by 1R and 2R, 21 articles were fully read. Neither of the documents were used, nor were the ones found in gray literature, since they mentioned FBDGs for children or adolescents already listed on FAO’s website.

Overview of included material

Ninety-two documents found were from a total of 59 countries, accordingly to the regions listed on FAO’s website: 72% of the listed countries in Latin America and the Caribbean (25–44, 81–95), 67% of the five countries in the Near East (76–80), 61% of 18 in Asia and the Pacific (17–24, 66–75), 35% in Europe (45–58, 96–102), all nine countries in Africa (59–65, 105–108), and all two countries in North America (103, 104).

Most of the FBDG documents found were written in English (51%) (17–24, 39, 40, 48, 60–81, 83, 89, 93, 96–98, 100–108), followed by Spanish (31%) (25, 26, 28–38, 41–44, 57, 82, 85–88, 90–92, 94, 95), French (45–47, 49, 50, 59), and German (51–56), representing 7% each, and the remaining documents (4%) were written in Portuguese (27, 84, 99) and Italian (58). Regarding the region of origin, 38% of the documents were from Latin America and the Caribbean (25–44, 81–95), 23% from Europe (45–58, 96–102), 19% from Asia and the Pacific (17–24, 66–75), 12% from Africa (59–65, 105–108), 6% from the Near East (76–80), and 2% from North America (103, 104).

About a third (30%) (27, 32, 33, 41, 42, 45–48, 50–56, 58, 82, 86, 89, 92, 97, 103–108) were dated from the past 5 years (2018–2022), 40% (17–26, 28–31, 39, 40, 43, 44, 49, 59, 60, 64–70, 76, 78, 79, 81, 84, 90, 91, 94, 101, 102) were from 2013 to



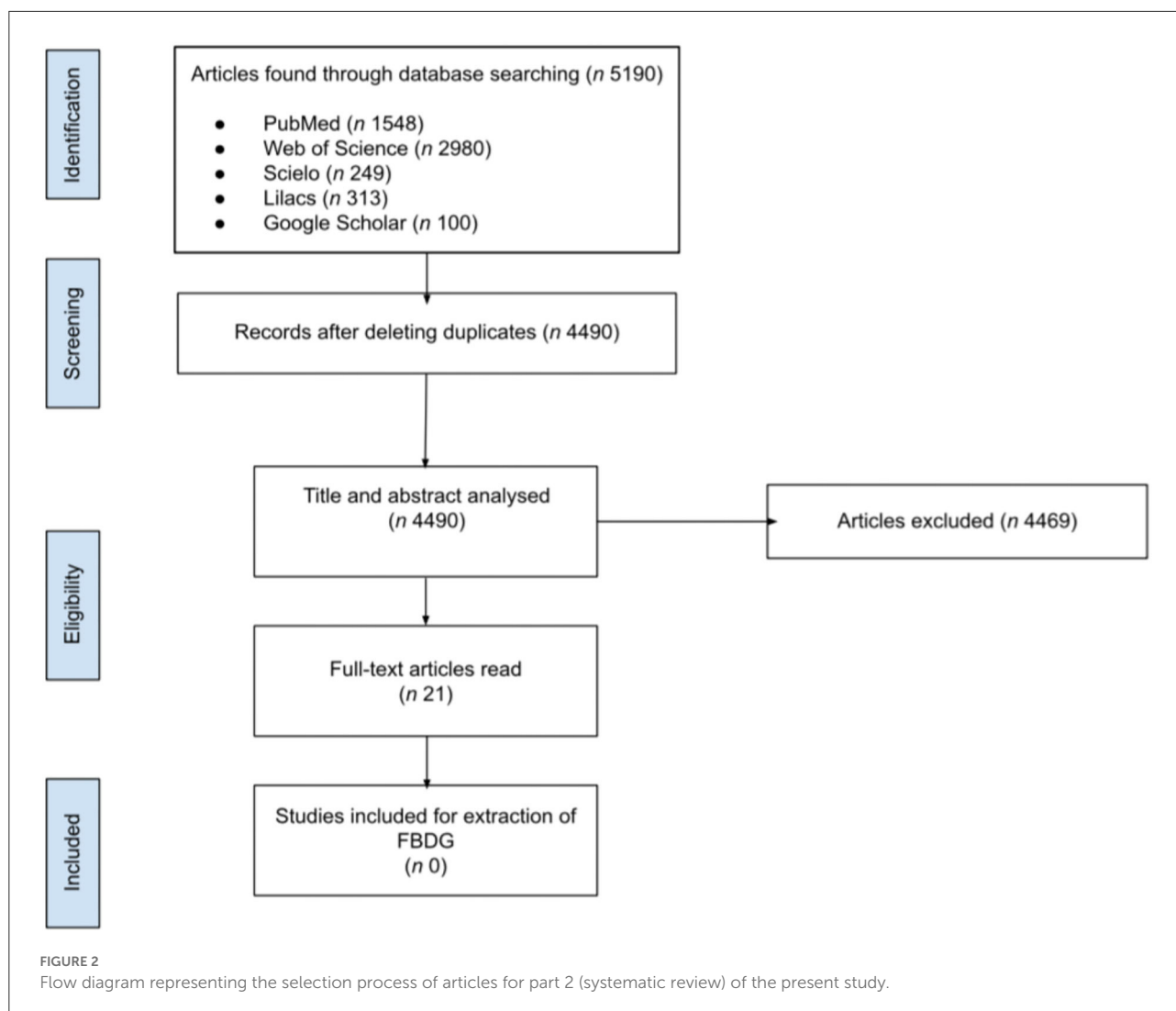
2017 and 19% (34–37, 71–74, 77, 80, 85, 87, 88, 93, 95, 96) were published between 2008 and 2012. The minority (11%) (38, 57, 61–63, 75, 83, 98–100) are dated before 2008, and none were published before 2000. The distribution of those FBDGs around the world is shown in Figure 3.

FBDG for the general population with information for children and adolescents

Forty-seven countries with general FBDG with specific information about the studied groups around the world were found: 15 in Latin America and the Caribbean (81–95), two in North America (103, 104), eight in Europe (58, 96–102), nine in Asia and the Pacific (66–75), nine in Africa (59–65, 105–108), and four in the Near East (76–80). Of those, only 12%

(58, 69, 70, 85, 97, 102) have food icons directed at children and adolescents. Their main characteristics are summarized in Supplementary Table 1.

The intended age group most frequently addressed in the general FBDG corresponds to group 1 (13%) (63, 72, 74, 81, 83, 89, 108), followed by group 2 (4%) (61, 94). None presented guidelines exclusively for group 3. As for those materials which comprehend more than one group, the majority contains recommendations for groups 1, 2, and 3 (40%) (58, 60, 62, 64, 69, 71, 77–79, 86, 90, 93, 95–101, 104), 33% for groups 2 and 3 (59, 67, 68, 73, 75, 76, 80, 82, 84, 88, 91, 92, 102, 105–107), and 10% for 1 and 2 (65, 66, 70, 85, 87). About the intended audience, most of the FBDG (54%) were targeted at the general population (58, 59, 61–64, 67–71, 73, 75, 77, 80, 81, 83, 87–89, 91, 94, 95, 99, 100, 102, 108), 28% were directed to professionals of a certain field, mainly health (65, 66, 72, 76, 85, 86, 90, 92, 96–98, 101, 103, 104), and 18% were directed for both the general



population and professionals (60, 74, 78, 79, 82, 84, 93, 105–107) (Supplementary Table 1).

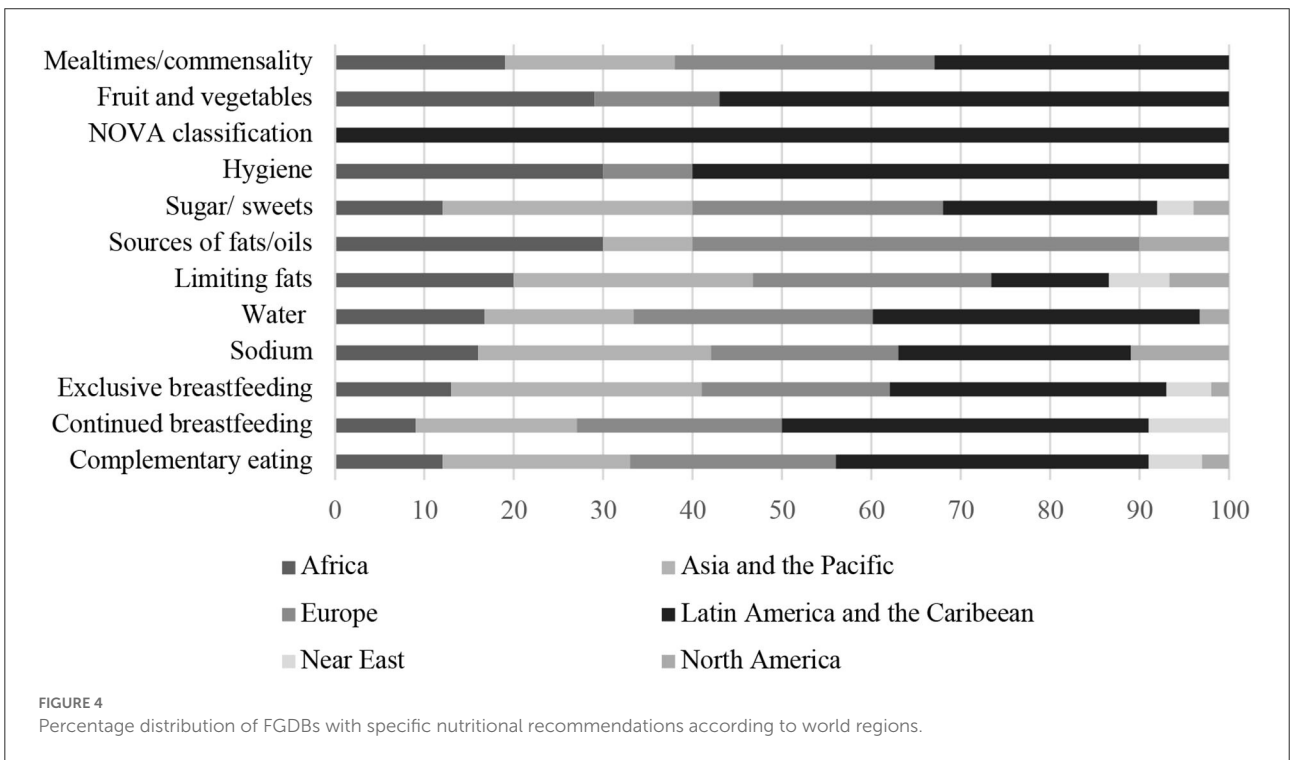
Most of the documents (57%) (58–62, 64–66, 71, 73–75, 77, 80, 87, 88, 90, 91, 95–98, 100–102, 104–107) presented food groups directed for the target population of this study. Nineteen percent (60–62, 65, 69, 90, 95–98) have recommendations for mealtimes, directed at children and adolescents (Supplementary Table 1).

Specific FBDG for children and adolescents

Seventeen countries with specific FBDG for the studied group were found: 59% in Latin America and the Caribbean (25–44), 23% in Europe (45–57), and 18% in Asia and the Pacific (17–24). None was found in

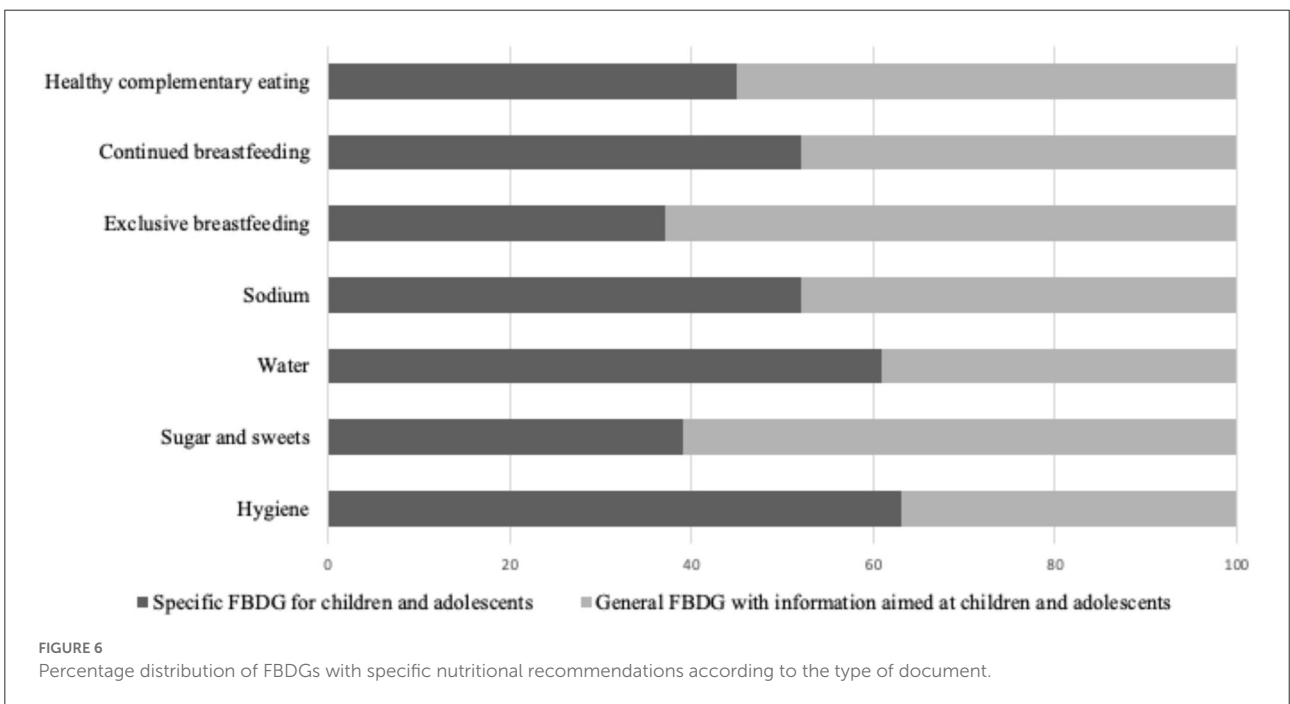
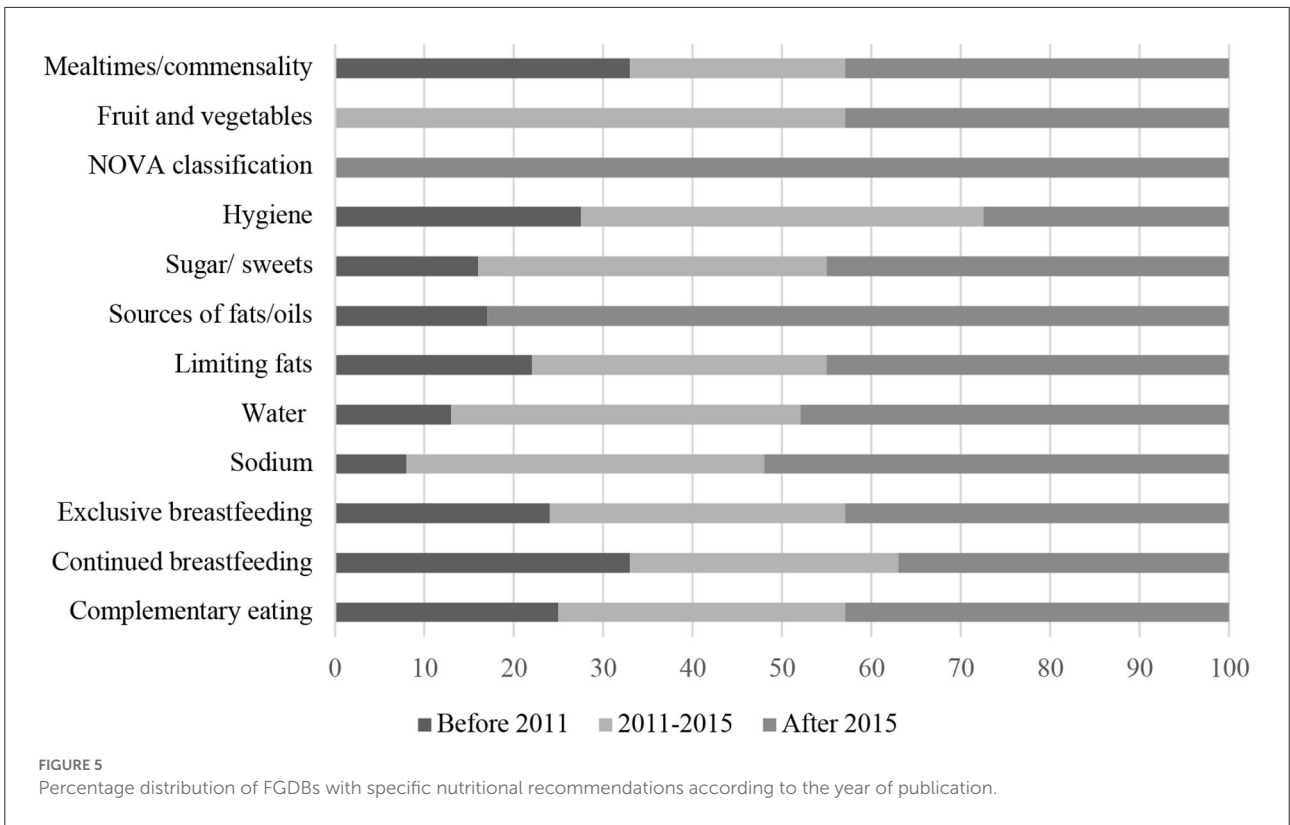
North America, Africa, and the Near East. From those 17 countries, 35% (23–26, 32, 33, 45–56) have specific icons for children and adolescents. The characteristics of those FBDGs for children and adolescents are summarized in Supplementary Table 2.

About half of the specific FBDG were aimed at group 1 (24%) (27, 34–38, 41–44), followed by group 2 (10%) (28–31) and group 3 (5%) (39, 40), and documents intended for more than one age group: 39% (17–22, 45–47, 51–57) corresponds to groups 1, 2, and 3, 12% (32, 33, 48–50) to groups 1 and 2, and 10% (23–26) to groups 2 and 3. Sixty-four percent (17–22, 25, 26, 28–31, 34–37, 41–50) were organized in guidelines and 32% (23–26, 28–31, 38–42) did not present recommendations for mealtimes. From the studied material that presents food groups, 85% (17–22, 27–38, 41–57) present at least four food groups: cereals or similar, animal protein sources, milk and dairy, and fruits and vegetables (Supplementary Table 2).



Figures 4, 5 show the distribution of relevant specific recommendations found in the FBDGs, according to world regions and year of publication, respectively.

Figure 6 shows the distribution of important specific recommendations found in the FBDGs according to the type of document (general or specific for the studied age groups) and



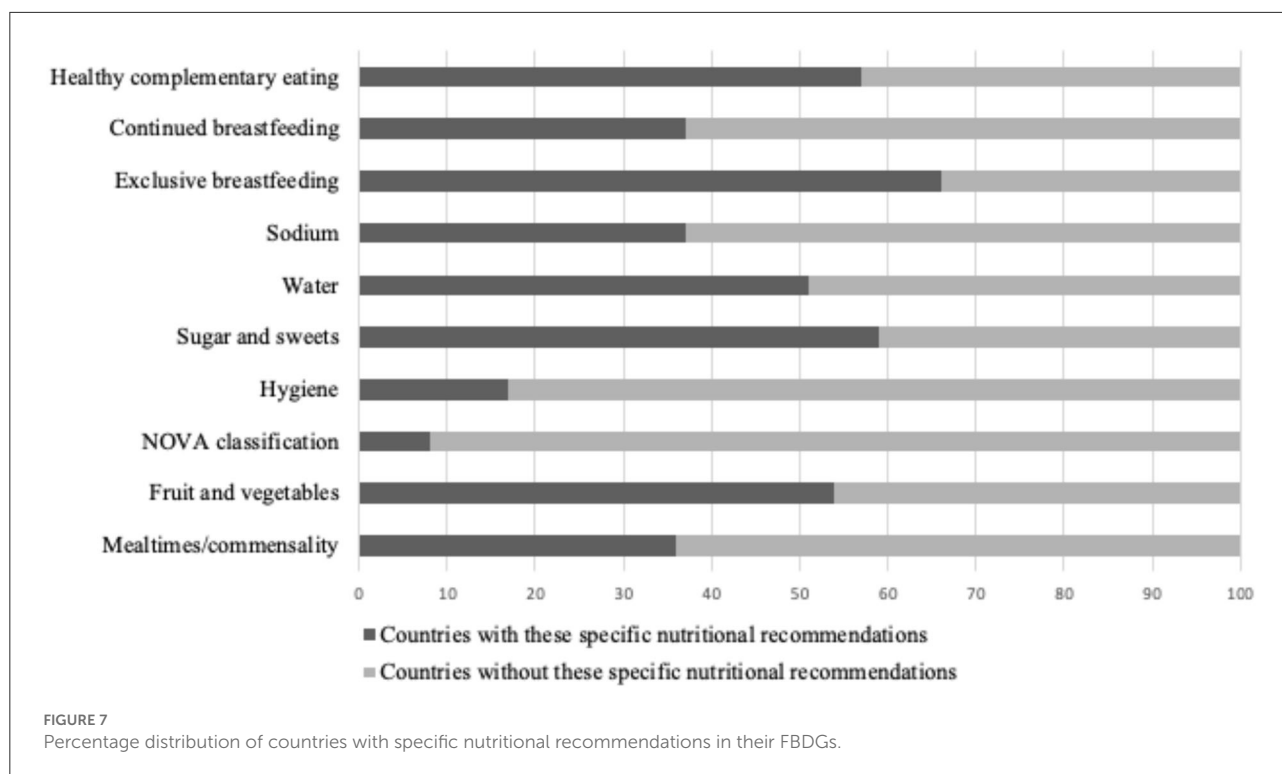


Figure 7 presents, in percentage, the number of countries with these specific recommendations in their FBDGs.

Recommendations for mealtimes and commensality

It was found 21 out of the 59 countries included guidance for eating habits in mealtimes, such as eating with the family, without using cellphones or television, in a calm environment (17, 21, 27, 32, 34, 37, 43, 45, 50, 53, 60–62, 65, 69, 90, 96–98). From these 21, 19 FBDG included guidance for eating habits in mealtimes for children and/or adolescents. There was no significant variation between specific and general documents on this topic (Supplementary Table 2).

Fruit and vegetables

Of the 27 countries, whose national FBDG had dietary guidelines aimed at children and adolescents, seven have an exclusive guideline for fruit and/or vegetable consumption (25, 26, 28–30, 49, 60, 65, 90), 67% of those documents were specific FBDG (25, 26, 28–30, 49). Also, 32 countries out of the 59 analyzed in this study bring some guidance about fruit consumption on the FBDG (17, 19–22, 25, 26, 28–31, 35, 48, 49, 57–60, 62, 64–67, 69, 71, 74, 75, 77, 80, 87, 90, 91, 96, 104–107), 43% were specific documents for children and adolescents (17, 19–22, 25, 26, 28–31, 35, 48, 49, 56, 57), and 26 encourage or

guide vegetable consumption for the studied group (17, 20, 22–31, 35, 48, 57–60, 62, 64–66, 69, 71, 74, 75, 77, 90, 91, 96, 105–107), 45% were in specific FBDG for the target population of this study (17, 20, 22–31, 35, 48, 57).

NOVA classification

Five (8%) out of the 59 countries showed the NOVA food classification system to gather the foods in groups in the FBDG, according to the processing level (27, 84, 86, 87, 92, 94). These countries are all from Latin America: Brazil, Ecuador, El Salvador, Peru, and Uruguay. Of the six FBDGs, which included the NOVA classification, most of them (83%) were general FBDGs (83, 85, 86, 91, 93).

Sugar and sweets

Among the 35 countries in which FBDG includes sugar and sweets guidance for children and adolescents, 26 (74%) showed guidance to reduce or avoid its consumption (17–22, 27, 29, 38–41, 49, 52, 58, 60, 64, 65, 67, 70, 71, 74, 75, 80, 85, 96–98, 101, 104–107). Of the 33 FBDG that provided this information, about a third (39%) were specific documents for the studied group (17–22, 27, 29, 38–41, 49, 52).

Besides the recommendations for reducing or avoiding sugar consumption, 11 countries (32%) (25, 26, 32–35, 41–44, 58, 69, 71, 90, 91, 100, 101) brought guidance on the number of portions or grams of sugar per day, accordingly to age. As for

the minimum age to be introduced to sweets, 20% (20–22, 41, 42, 48, 49, 58, 74, 97, 100) recommended 12 months old, 17% (17–19, 27, 60, 96, 101, 104), 24 months old, and 1 (65) country advised to not offer sugar to children under 3 years old. Some of the materials also correlated high sugar consumption with chronic diseases, such as diabetes, corresponding to 6% (86, 105–107) of the 35 countries. One country (45, 49) presented the recommendation to introduce sugar for 8 months old children.

Approximately, 15% (64, 67, 97, 104–107) of the countries recommended sugar intake below 10% of total daily calories, of those two (64, 105–107) countries limit sugar intake to 5% of daily.

More than half (65%) (17, 25, 28, 29, 31, 34, 35, 41, 42, 48, 49, 57, 60, 64, 65, 69, 71, 74, 75, 90, 91, 96, 97, 100, 101, 104–107) of the countries presented some information about sugar and sweets intake addressed for age group 2 (preschool-age and school-age children), 53% (18–20, 27, 41–45, 48, 49, 60, 64, 65, 71, 74, 96, 97, 100, 101, 104–107) for age group 1 (infants and children under 2 years old), and 44% (17, 26, 30, 31, 34, 35, 39, 40, 60, 75, 90, 91, 96–98, 100, 101, 104) for age group 3 (Adolescents).

Fats

From the 33 countries whose FBDG included fat and oils consumption guidance (17–22, 25–32, 34, 35, 37, 38, 43, 45, 49, 56–58, 60, 62, 64–66, 71, 74, 75, 78, 79, 88, 90, 91, 95–98, 100, 101, 104), 10 (30%) provided guidance on the best sources (22, 27, 45, 49, 60, 62, 64, 96, 97, 104), 15 (45.5%) highlighted the limit of fat consumption (17, 19, 21, 22, 49, 56, 60, 64, 65, 69, 75, 80, 85, 88, 98, 101, 104), and 6 (18.2%) guided good sources and limit the consumption of oils and fats (22, 49, 56, 60, 64, 104). Among the 44 FBDGs that provided fat and oils consumption guidance, 55% were specific documents for the studied group (17–22, 25–32, 34, 35, 37, 38, 43, 45, 49, 56, 57, 101).

Sodium

Among the 22 countries that the FBDG provides guidance on sodium consumption for the age group studied, 19 focus on limiting its consumption (17–22, 25–27, 33, 41, 45, 56, 58, 60, 64, 65, 71, 74, 75, 84, 95, 97, 103, 104). There were 25 FBDGs that included guidance for sodium consumption for children and/or adolescents, 52% of them were specific FBDGs for the studied group (17–22, 25–27, 33, 41, 45, 56).

About a third (36%) (58, 60, 64, 96, 97, 101, 103, 104) of these countries brought recommendations per age, limiting sodium intake and 23% (20–22, 32, 33, 41, 42, 58, 60) discourages its intake for children under 12 months old. Five countries (17, 60, 65, 74, 104) provide orientation in their FBDG about avoiding salty snacks and foods rich in sodium and one country (94) recommended avoiding having salt on the table at mealtimes.

As for the guidance, about half (45%) (26, 58, 60, 64, 74, 75, 96, 97, 101, 104) of the countries presented information addressed for age group 2 (preschool-age and school-age children), 45% (26, 58, 60, 64, 74, 75, 96, 97, 101, 103, 104) for age group 3 (Adolescents) and 36% (20–22, 27, 32, 33, 58, 60, 97, 101, 104) for age group 1 (infants and children under 2 years old).

Exclusive breastfeeding

It was found that 39 countries had exclusive breastfeeding until 6 months old guidance in their FBDGs (18–20, 27, 31, 33, 34, 36, 38, 41–43, 45, 49, 51, 52, 58, 60, 62–74, 78, 80, 81, 89, 90, 95–98, 100, 104, 108). Among the 43 FBDG that provided this information, 37% were specific documents for the studied group (18–20, 27, 31, 33, 34, 36, 38, 41–43, 45, 49, 51, 52). The majority (70%) (27, 34, 36, 38, 41–43) of specific FBDG aimed at group 1 presented guidance about exclusive breastfeeding.

Continued breastfeeding

Twenty-two countries have also continued breastfeeding orientation in their FBDG (18, 19, 27, 33, 34, 36–38, 41–43, 51–53, 58, 62, 64, 68, 72, 74, 78, 80, 90, 95–99). Of the 27 FBDGs that provided this information, 52% were specific documents for the studied group (18, 19, 27, 33, 34, 36–38, 41–43, 51–53). About 80% (27, 34, 36–38, 41–43) of specific FBDG directed to group 1 have this recommendation.

Healthy complementary eating

Thirty-four countries had FBDG that addressed guidance on healthy complementary eating (18–20, 27, 31, 33, 34, 37, 38, 41, 43, 45, 48, 51–53, 57, 58, 60, 62, 64–67, 69, 71, 72, 74, 78, 80, 88–90, 95–98, 100, 105). There were 38 documents that included guidance for healthy complementary eating, 45% of them were specific FBDG for the studied group (18–20, 27, 31, 33–35, 38, 41, 43, 45, 48, 51–53, 57). More than half (60%) (27, 34, 37, 38, 41, 43) of the materials specific to group 1 presented guidance on this subject.

Discussion

This article intends to fill a gap about the main characteristics of the current general and specific FBDGs around the world that bring guidance aimed at children and adolescents. A previous study (8) identified 17 specific FBDGs for children and adolescents around the world, so the growing elaboration of this type of material can be seen, given that the present study identified 41 FBDGs aimed specifically at this age group. This can be explained by the relevance that the food habits in childhood and adolescence have in dietary patterns through adulthood and in the child's development (6, 109, 110).

It can also be noticed that the regions that had the highest growth of countries with specific FBDGs since 2011 (8) were Latin America and the Caribbean, with 10 new specific FBDGs since 2011 (25–44). That growth is in line with the context of the double burden of malnutrition that Latin America and the Caribbean countries are experiencing. In this way, the focus of nutrition policies shifts from an undernourished population to a developing country with overweight and obese population (111, 112).

Even though there was an increase in the number of specific FBDGs aimed at children and adolescents around the world, it is not yet widespread in many countries, which is explicit in this study as most of the documents found were aimed at the general population. This shows a limitation to adapt the contents of the guidelines in order to make them understandable and motivational to the target population (113). Also, specific documents are important as each life stage has its singularities, such as nutritional needs and interests (114).

Age groups most cited in general FBDGs are schoolers and preschoolers. This is justified as most countries that have specific documents have those types of guides only aimed at children under 2 years old (20, 27, 32, 34–38, 41–45, 48, 51–53). Thus, it is clear that groups 2 and 3 are neglected, as they also need specific nutritional recommendations and the number of specific materials for each of them is fewer (18, 19, 21–26, 28–31, 33, 39, 40, 46, 47, 54–56).

When analyzing the results obtained by the study, it is possible to notice the great differences in the way of presenting nutritional guidance for the studied group, both in specific and general FBDGs. This information can be exposed in the documents through nutritional guidelines, icons, didactic design, food groups, and others. Those differences can be explained by the singularities of each region, the prevalence of nutritional inadequacies, and food culture, e.g., China's food icon being an abacus (69, 115).

Food icons or graphic representations are a tool for nutritional education, as they can represent quantities and even the frequency of consumption recommended for each food group in a succinct way (115). There are some differences between the shapes of food icons found. There is often a relation between the countries' cultures and the shapes chosen, as it seems to evoke the cultural food choices and some cultural food elements suggest cooking, besides the proportion between food groups (116). It is important to remember the relevance of culture in food choices since food practices such as cooking and having meals can be part of identity (117).

However, literature has suggested limitations when it comes to FBDGs' graphic representations, such as Food Pyramids and Plates, due to the attempt to summarize all choices consumers need to make in order to maintain healthy eating habits (118). Another important aspect is that the interpretation of such elements can demand subjective comprehension and the

possible struggle of the population on comprehending abstract concepts (119).

About food groups, most of the specific FBDG presented a meat/animal source protein. When it comes to recommendations, developing countries with high undernutrition prevalence recommend red meat consumption in order to prevent anemia, especially among younger groups (9), such as Guatemala's FBDG (38). Others recommend altering between protein sources, which is an important recommendation and seems to be related to environmental sustainability concerns, such as Panama's document (41), Brazil's (27), China's (69), Belgium's (46, 47), and Australia's materials (17, 19), in which the recommendations were to consume other protein sources, such as lean meats and poultry, besides vegetable protein sources as legumes and nuts.

Another feature explored related to diet quality is commensality. Eating in the company of the family has proved to have a protective effect against obesity in children and adolescents, besides supporting healthy eating habits. This practice elevates the consumption of fruits and vegetables and several micronutrient intakes. It also decreases the risk of being overweight and obese in adolescents (120). Therefore, it is valuable that the FBDG present recommendations to endorse family meals as recommendations for mealtimes, both general and specific FBDG (17–22, 27, 36, 37, 45–56, 60, 65, 90, 95, 96).

Asia and the Pacific are the regions with most countries with FBDG that brought guidance on fruit (29%) (17, 19–22, 66, 67, 71, 74, 75) and vegetable (32%) (17, 20, 22–24, 66, 69, 71, 74, 75) consumption, which might demonstrate concern with the population's eating habits such as the growth rates of ultra-processed food consumption (121).

It is observed that Latin America is in a food transition, characterized by lower consumption of fruits and vegetables and with a high or growing participation of ultra-processed products in diet (108). This can justify why most countries with specific guidelines for fruit and/or vegetable consumption were in Latin America and the Caribbean (25, 26, 28–30, 90). It is also related to the nutritional transition presented in these countries, in which there are growing rates of overweight, obesity, and chronic diseases associated with weight gain (111). All of these FBDGs have been published after 2011, 43% after 2015, which is related to the fact that both food and nutritional transitions in Latin America are still considered recent processes.

All FBDG which use the NOVA food classification system were from Latin American countries (39, 40, 53, 54, 68, 70), which can be explained by the development of this tool being made in Brazil, by researchers of the Center for Epidemiological Research in Nutrition and Health of the University of São Paulo (12). Two recent systematic reviews (122, 123) have highlighted an association between high ultra-processed food intake and a variety of adverse health outcomes for adults, such as overweight, obesity, and different non-communicable chronic diseases, including cancer, hypertension, diabetes, and

dyslipidemia. Among children and adolescents (123), the outcomes of high ultra-processed food consumption include cardio-metabolic risks and asthma; thus, there is already a body of evidence supporting the incorporation of the NOVA classification in dietary guidelines as a scientific concept to evaluate the “healthiness” of foods, including those directed to children and adolescents. Knowledge about the processing level of food is needed in order to design effective nutritional guidance to prevent chronic diseases and to promote adequate food production and distribution systems (111).

In developing countries, it can be noticed that food-related illness such as diarrhea has an expressive role in children’s mortality rates (124). Also, a study showed that there is a substantial correlation between the Human Development Index (HDI) of a country and diarrhea-associated deaths among children (125). Thus, developing countries with lower HDI, such as those in Latin America (25, 26, 34, 37, 41, 43, 90) and Africa (61, 64, 65), represent almost all the countries with hygiene guidelines in the FBDG, to guide the population and prevent those diseases. Also, this explains the lack of a hygiene guideline in FBDGs in regions with developed countries with higher HDI, such as those from North America and Europe.

As most of the materials analyzed that brought orientations on topics such as hygiene and water consumption were specific FBDGs (17–31, 34, 38–41, 43, 45, 47, 49, 51, 52, 56, 57), it is also evident that specific documents can include more about topics indirectly related to food consumption. It is possible because there is space to embrace those topics in specific documents as it provides guidelines for a narrower target audience than general FBDGs.

By 1999, the United States Department of Agriculture (USDA) determined a limitation in the consumption of fats for children, which might explain no FBDG with such guidance before 2001. Also, there is an evident limitation of the FBDGs in relation to the consumption guidelines for the groups of fats and sugars, as this often occurs through recommendations of “moderate use” or “minimum quantity,” which can lead to different interpretations of the amount that should or can be consumed (113).

The World Health Organization (WHO) recommendations for sugar intake are up to 5% of daily calorie intake (126), which was present in 6% (64, 105–107) of the countries that advised about sugar and sweets consumption for children. Dietary patterns rich in sugar can lead to oral caries, diabetes, and other non-communicable diseases (NCDs) (126); therefore, guidance on high-sugar foods and beverages should be present in FBDG (127).

Furthermore, the rising prevalence of obesity and non-communicable diseases in childhood and adolescence is concerning. According to WHO (127), some strategies to prevent obesity are related to limiting the consumption of foods and beverages high in fat, sugar, and salt by infants and young children. Guidance to avoid those foods and regulations on the

marketing and sale of beverages and snacks of that category are measures that can be adopted by the government to prevent excess weight gain among children.

Guidance on sodium consumption is recent, which can be noticed as most of the FBDG analyzed with this orientation have been published after 2015 (21, 22, 27, 33, 41, 45, 56, 58, 60, 64, 97, 103, 104). This characteristic can be associated with the greater accumulation of scientific evidence about the harmful effects of excessive sodium consumption and the increasing salt or sodium consumption data among the studied age group (128). Guidance on sodium consumption for children and adolescents is necessary because of the growing pace of pathogenic processes of chronic diseases in these stages of life (129). Research demonstrates that 80% of Brazilian adolescents consume above the upper level of sodium and almost 10% of them have hypertension (128). Sodium consumption has an impact not only in the economic sphere, in relation to diseases associated with excessive consumption, but it is also related to premature death (130).

Yet, reducing salt intake is related to increasing population health, by preventing outcomes such as cardiovascular diseases, besides being a low-cost measure. On this path, it is essential to maintain the population’s awareness of the necessity to reduce salt consumption, such as by not having salt shakers on the table at mealtimes, and avoiding high in sodium snacks and foods (131).

Among the 39 countries that presented exclusive breastfeeding guidance, 17 did not mention continued breastfeeding orientation in their FBDGs (20, 31, 45, 49, 61, 64, 66–68, 70–72, 74, 82, 90, 100, 104, 108), recommended by the WHO for the practice to be continued for up to 2 years old or longer (132). As known in the literature, breast milk contains all nutrients to promote the healthy growth and development of infants (133). Besides, a study has shown a negative correlation between breast milk intake with the consumption of ultra-processed food and sweetened beverages, being evident in this impact on childhood obesity and NCDs (134). It seems this type of orientation could reinforce the practice among breast feeders and health professionals; it is, therefore, suggested that updates in the FBDG take this into account.

The study has some limitations regarding the translation of some documents, which were left out such as those in Russian, Khmer, and Hebrew. Also, there might be FBDG not mentioned in the FAO; however, a systematic review was carried out to maximize the possibility of identifying them, but no additional material was found.

Conclusion

The present study summarized different countries’ official recommendations for children and adolescents in

order to compare and acknowledge the available content in this field. It was possible to notice the materials' diversity, due to both the nutritional and political aspects of each region. In this context, Latin America stands out for its orientations for the studied group. The relevance of understanding the tendencies around the world is to be aware of possible gaps, without putting aside the specificities of each population. This review did not aim to measure the possible impacts and comprehension of FBDGs, nor other subjective evaluations of the materials, which can be explored by further studies.

Author contributions

JC and MM: parts 1 and 2 of the study, writing, data extraction, and analysis. GM: data extraction, writing review, and advising/orientation. LS: writing review. NT: design of the study, writing review, and advising/orientation. All authors contributed to the article and approved the submitted version.

References

- Gabe K, Tramontt C, Jaime P. Implementation of food-based dietary guidelines: conceptual framework and analysis of the Brazilian case. *Public Health Nutr.* (2021) 24:6521–33. doi: 10.1017/S1368980021003475
- World Health Organization, Food and Agriculture Organization of the United Nations. *FAO/WHO Technical Consultation on National Food- Based Dietary Guidelines.* Cairo (2006). p. 80.
- Cámara M, Giner RM, González-Fandos E, López-García E, Mañes J, Portillo MP, et al. Food-based dietary guidelines around the world: a comparative analysis to update AESAN Scientific Committee Dietary Recommendations. *Nutrients.* (2021) 13:3131. doi: 10.3390/nu13093131
- European Food Safety Authority. Scientific opinion on establishing food-based dietary guidelines. *EFSA J.* (2010) 8:1460. doi: 10.2903/j.efsa.2010.1460
- United Nations Children's Fund. *Review of National Food-Based Dietary Guidelines and Associated Guidance for Infants, Children, Adolescents, and Pregnant and Lactating Women.* New York, NY: UNICEF (2020).
- Beluska-Turkan K, Korczak R, Hartell B, Moskal K, Maukonen J, Alexander DE, et al. Nutritional gaps and supplementation in the first 1000 days. *Nutrients.* (2019) 11:2891. doi: 10.3390/nu11122891
- Sawyer SM, Azzopardi PS, Wickremarathne D, Patton GC. The age of adolescence. *Lancet Child Adolesc Health.* (2018) 2:223–8. doi: 10.1016/S2352-4642(18)30022-1
- Horta PM, Pascoal MN, Santos LCD. Updating dietary guides for children and adolescents: a review. *Revista Brasileira de Saúde Materno Infantil.* (2011) 11:115–24. doi: 10.1590/S1519-38292011000200002
- Herforth A, Arimond M, Álvarez-Sánchez C, Coates J, Christianson K, Muehlhoff E. A global review of food-based dietary guidelines. *Adv Nutr.* (2019) 10:590–605. doi: 10.1093/advances/nmy130
- Erve I, Tulen CB, Jansen J, Minnema R, Schenk PR, Wolvers D, et al. Overview of elements within national food-based dietary guidelines. *Eur J Nutr Food Saf.* (2017) 7:1–56. doi: 10.9734/EJNFS/2016/32645
- Food and Agriculture Organization of the United Nations. *Food-Based Dietary Guidelines.* (2020). Available online at: <http://www.fao.org/nutrition/education/food-based-dietary-guidelines> (accessed February 2, 2020).
- Monteiro CA, Cannon G, Levy RB, Moubarac JC, Louzada MLC, Rauber F, et al. Ultra-processed foods: what they are and how to identify them. *Public Health Nutr.* (2019) 22:936–41. doi: 10.1017/S1368980018003762
- Munn Z, Peters MD, Stern C, Tufanaru C, McArthur A, Aromataris E. Systematic review or scoping review? Guidance for authors when choosing between a systematic or scoping review approach. *BMC Med Res Methodol.* (2018) 18:143. doi: 10.1186/s12874-018-0611-x
- Tricco AC, Lillie E, Zarin W, O'Brien KK, Colquhoun H, Levac D, et al. PRISMA extension for scoping reviews (PRISMA-ScR): checklist and explanation. *Ann Intern Med.* (2018) 169:467–73. doi: 10.7326/M18-0850
- Rezende JLC, de Medeiros MC, Rhaisa G, Santos LC d, Toral N. *Food Based Dietary Guidelines for Children and Adolescents: A Scoping Review.* OSF (2021). Available online at: osf.io/79xzg
- Ouzzani M, Hammady H, Fedorowicz Z, Elmagarmid A. Rayyan — a web and mobile app for systematic reviews. *Systemat Rev.* (2016) 5:210. doi: 10.1186/s13643-016-0384-4
- National Health and Medical Research Council. *Healthy Eating for Children: Teach Your Child Healthy Habits for a Healthy Life.* Canberra, ACT: Department of Health and Ageing, National Health and Medical Research Council, Government of Australia (2013).
- National Health and Medical Research Council. *Giving Your Baby the Best Start: The Best Foods for Infants.* Canberra, ACT: Department of Health and Ageing, National Health and Medical Research Council, Government of Australia (2013).
- National Health and Medical Research Council. *Infant Feeding Guidelines.* Canberra, ACT: Department of Health and Ageing, National Health and Medical Research Council, Government of Australia (2013).
- Ministry of Health. *Eating for Healthy: Babies and Toddlers.* Wellington: Ministry of Health, New Zealand Government (2013).
- Ministry of Health. *Eating for Healthy: Children.* Wellington: Ministry of Health, New Zealand Government (2017).
- Ministry of Health. *Healthy Eating for Young People.* Wellington: Ministry of Health, New Zealand Government (2017).

Conflict of interest

The authors declare that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

Publisher's note

All claims expressed in this article are solely those of the authors and do not necessarily represent those of their affiliated organizations, or those of the publisher, the editors and the reviewers. Any product that may be evaluated in this article, or claim that may be made by its manufacturer, is not guaranteed or endorsed by the publisher.

Supplementary material

The Supplementary Material for this article can be found online at: <https://www.frontiersin.org/articles/10.3389/fpubh.2022.1033580/full#supplementary-material>

23. Food and Nutrition Research Institute. *Pinggang Pinoy: Healthy Food Plate for Filipinos - Kids*. Taguig: Department of Science and Technology, Republic of the Philippines (2016).
24. Food and Nutrition Research Institute. *Pinggang Pinoy: Healthy Food Plate for Filipinos - Teens*. Taguig: Department of Science and Technology, Republic of the Philippines (2016).
25. Ministerio de Salud y Deportes. *Guía Alimentaria para el Niño y la Niña en edad escolar (Food-based Dietary Guidelines for School-age Children)*. La Paz, Bolivia: Dirección General de Promoción de la Salud, Unidad de Alimentación y Nutrición, Ministerio de Salud y Deportes. (2013).
26. Ministerio de Salud y Deportes. *Guía Alimentaria para las y los adolescentes (Food-based Dietary Guidelines for Teenagers)*. La Paz, Bolivia: Dirección General de Promoción de la Salud, Unidad de Alimentación y Nutrición, Ministerio de Salud y Deportes (2013).
27. Ministério da Saúde. *Guia alimentar para crianças menores de dois anos (Food-based Dietary Guidelines for children under two years-old)*. Brasília, Brasil: Secretaria de Atenção Primária à Saúde, Departamento de Atenção à Saúde, Ministério da Saúde (2019).
28. Universidad de Chile. *Guía de alimentación del preescolar (Food-based dietary guidelines for preschoolers)*. Santiago: Instituto de Nutrición y Tecnología de los Alimentos (INTA), Universidad de Chile (2016).
29. Universidad de Chile. *Guía de alimentación del escolar (Food-based dietary guidelines for school-age children)*. Santiago: Instituto de Nutrición y Tecnología de los Alimentos (INTA), Universidad de Chile (2016).
30. Universidad de Chile. *Guía de alimentación del adolescente (Food-based dietary guidelines for teenagers)*. Santiago: Instituto de Nutrición y Tecnología de los Alimentos (INTA), Universidad de Chile (2016).
31. Ministerio de Salud. *Guía de Alimentación del niño (a) menor de 2 años/Guía de Alimentación hasta la adolescencia (Food-based dietary guidelines for children under 2 years-old/Food-based dietary guidelines until adolescence)*. Santiago: Departamento de Nutrición y Alimentos, Ministerio de Salud (2016).
32. Instituto Colombiano de Bienestar Familiar, Food and Agriculture Organization. *Mi plato, un arcoiris divertido de sabores (My plate, a fun rainbow of flavors)*. Bogotá: Instituto Colombiano de Bienestar Familiar, Gobierno de Colombia (2019).
33. Instituto Colombiano de Bienestar Familiar, Food and Agriculture Organization. *Guías Alimentarias basadas en alimentos para mujeres gestantes, madres en período de lactancia y niños y niñas menores de 2 años de Colombia (Food-based dietary guidelines for pregnant women, lactating women and children under 2 years-old from Colombia)*. Bogotá: Instituto Colombiano de Bienestar Familiar, Gobierno de Colombia (2018).
34. Instituto de Nutrición e Higiene de los alimentos, Ministerio de Salud Pública. *Guías Alimentarias para niños y niñas cubanos hasta 2 años de edad - Documento técnico para los equipos de salud (Food-based Dietary Guidelines for Cuban children under 2 years-old)*. Ciudad de La Habana: Instituto de Nutrición e Higiene de los alimentos, Dirección Nacional Materno Infantil, Ministerio de Salud Pública (2009).
35. Ministerio de Salud Pública. *Guías Alimentarias para la población cubana mayor de 2 años de edad (Food-based Dietary Guidelines for cubans over 2 years-old)*. Ciudad de La Habana: Instituto de Nutrición e Higiene de los alimentos, Ministerio de Salud Pública (2009).
36. Ministerio de Salud Pública. *Guía Alimentaria de la Lactancia Materna - Lineamientos Técnicos (Food-based dietary guidelines for Breastfeeding - Technical Guidelines)*. Quito: Dirección de Nutrición, Ministerio de Salud Pública (2009).
37. Ministerio de Salud Pública. *Guía Alimentaria de la Alimentación Complementaria - Lineamientos Técnicos (Food-based dietary guidelines for Complementary feeding - Technical Guidelines)*. Quito: Dirección de Nutrición, Ministerio de Salud Pública (2009).
38. Ministerio de Salud Pública y Asistencia Social. *Guías Alimentarias para la Población Guatemalteca menor de 2 años (Food-based Dietary Guidelines for Guatemalan Population under 2 years-old)*. Ciudad de Guatemala: Ministerio de Salud Pública y Asistencia Social (2003).
39. Ministry of Health. *Eating Healthy Makes Sense - Tips for Teen Girls*. Kingston: Ministry of Health (2015).
40. Ministry of Health. *Eating Healthy Makes Sense - Tips for Teen Boys*. Kingston: Ministry of Health (2015).
41. Ministerio de Salud de Panamá. *Guías Alimentarias para los menores de 2 años de Panamá (Food-based Dietary Guidelines for under 2 years-old from Panama)*. Ciudad de Panamá: Ministerio de Salud de Panamá (2018).
42. Ministerio de Salud de Panamá. *Guías Alimentarias para los menores de 2 años de Panamá - Documento técnico (Food-based Dietary Guidelines for under 2 years-old from Panama - Technical Document)*. Ciudad de Panamá: Ministerio de Salud de Panamá (2018).
43. Instituto Nacional de Alimentación y Nutrición. *Guías Alimentarias para niños y niñas menores de 2 años del Paraguay (Food-based dietary Guidelines of Paraguay for children under 2 years-old)*. Asunción: Instituto Nacional de Alimentación y Nutrición, Ministerio de Salud y Bienestar Social (2015).
44. Instituto Nacional de Alimentación y Nutrición. *Recetas para niñas y niños a partir de los 6 meses (Recipes for children from 6 months-old)*. Asunción: Programa de Alimentario Nutricional Integral, Instituto Nacional de Alimentación y Nutrición, Ministerio de Salud y Bienestar Social (2015).
45. Ministre des Affaires Sociales. *Guide 1 - Vivement recommandé pour futures mamans et parents avec enfants de 0 à 3 ans (Guide 1 - Highly recommended for future moms and parents of 0 to 3 years-old children)*. Bruxelles: Plan National Nutrition Santé, Ministre des Affaires Sociales (2020).
46. Ministre des Affaires Sociales. *Guide 2 - Vivement recommandé pour enfants de 3 à 12 ans et leur parents (Guide 2 - Highly recommended for 3 to 12 years-old children and their parents)*. Bruxelles: Plan National Nutrition Santé, Ministre des Affaires Sociales (2020).
47. Ministre des Affaires Sociales. *Guide 3 - Coup de foudre vivement recommandé aux garçons et filles entre 12 et 18 (Guide 3 - Love at first sight highly recommended to boys and girls from 12 to 18 years-old)*. Bruxelles: Plan National Nutrition Santé, Ministre des Affaires Sociales (2020).
48. Federal Food Safety and Veterinary Oce. *Introducing Foods to Infants*. Bern: Federal Food Safety and Veterinary Oce, Swiss Society for Nutrition, Swiss Society of Paediatrics (2018).
49. Office fédéral de la sécurité alimentaire et des affaires vétérinaires. *Alimentation des nourrissons et des enfants en bas âge (Feeding infants and young children)*. Berne: Office fédéral de la sécurité alimentaire et des affaires vétérinaires (2017).
50. Société Suisse de Nutrition. *Alimentation durant l'enfance avec le disque alimentaire suisse*. (2021). Available online at: <https://www.sge-ssn.ch/fr/toi-et-moi/boire-et-manger/aux-differents-ages/enfance/> (accessed September 10, 2021).
51. Bundesministerium Soziales, Gesundheit, Pflege und Konsumentenschutz. *Richtig Essen von Anfang An! Babys erstes Löffelchen (Eat well from the beginning! Babies' first spoon)*. Vienna: AGES - Österreichische Agentur für Gesundheit und Ernährungssi- cherheit GmbH, Zentrum Ernährung & Prävention (2020).
52. Bundesministerium Soziales, Gesundheit, Pflege und Konsumentenschutz. *Richtig Essen von Anfang An! Poster Babys erstes Löffelchen (Eat well from the beginning! Poster Babies' first spoon)*. Vienna: AGES - Österreichische Agentur für Gesundheit und Ernährungssi- cherheit GmbH, Zentrum Ernährung & Prävention (2020).
53. Bundesministerium Soziales, Gesundheit, Pflege und Konsumentenschutz. *Richtig Essen von Anfang An! Infografik Die Ernährung des Säuglings im Ersten Lebensjahr (Eat well from the beginning! Baby's first year nutrition)*. Vienna: AGES - Österreichische Agentur für Gesundheit und Ernährungssi- cherheit GmbH, Zentrum Ernährung & Prävention (2020).
54. Bundesministerium Soziales, Gesundheit, Pflege und Konsumentenschutz. *Richtig Essen von Anfang An! Jetzt ess ich mit den Großen! Richtig essen für Ein- bis Dreijährige (Eat well from the beginning! Now I'm eating with the big ones! - Healthy eating for 1 to 3 year-olds)*. Vienna: AGES - Österreichische Agentur für Gesundheit und Ernährungssi- cherheit GmbH, Zentrum Ernährung & Prävention (2020).
55. Bundesministerium Soziales, Gesundheit, Pflege und Konsumentenschutz. *Ernährungspyramide für Kinder (Food Pyramid for children)*. Vienna: AGES - Österreichische Agentur für Gesundheit und Ernährungssi- cherheit GmbH, Zentrum Ernährung & Prävention (2020).
56. Bundesministerium Soziales, Gesundheit, Pflege und Konsumentenschutz. *Richtig Essen von Anfang An! So schmeckt's uns allen! Richtig essen für 4- bis 10-Jährige (Eat well from the beginning! This is how it tastes for all of us! Healthy eating for 4 to 10 year-olds)*. Vienna: AGES - Österreichische Agentur für Gesundheit und Ernährungssi- cherheit GmbH, Zentrum Ernährung & Prävention (2020).
57. Agencia Española de Seguridad Alimentaria y Nutrición. *Nutrición saludable de la infancia a la adolescencia: La Alimentación de tus niños (Healthy Nutrition from childhood to adolescence: The feeding of your children)*. Madrid: Ministerio de Sanidad y consumo, Gobierno de España (2005).
58. Consiglio per la ricerca in agricoltura e l'analisi dell'economia agraria, CREA. *Centro di Ricerca Alimenti e nutrizione. Linee guida per una sana alimentazione (Guidelines for healthy eating)*. Roma: Ministero delle politiche agricole, alimentari e forestali, Governo Italiano (2018).
59. Conseil National de L'Alimentation et de la Nutrition, CAN. *Guide alimentaire du Bénin (Food Guide of Benin)*. Porto-Novo: République du Bénin (2015).

60. Ministry of Health. *National Guidelines for Healthy Diets*. Nairobi: Ministry of Health, Government of Kenya (2017).
61. National Food Security and Nutrition Council. *Food & Nutrition Guidelines for Namibia: Food Choices for a Healthy Life*. Windhoek: Ministry of Health and Social Services, Government of Namibia (2000).
62. Federal Ministry of Health. *Food-Based Dietary Guideline for Nigeria: A Guide for Healthy Eating*. Abuja: Nutrition division, Federal Ministry of health, Government of Nigeria (2006).
63. Ministry of Health and Social Services. *The Seychelles Dietary Guidelines*. Victoria: Nutrition Unit, Ministry of Health and Social Services, Government of Seychelles (2006).
64. Ministry of Agriculture, Forestry and Food Security, Ministry of Health and Sanitation and Ministry of Education, Science and Technology. *Sierra Leone Food Based Dietary Guideline for Healthy Eating*. Freetown: Ministry of Agriculture, Forestry and Food Security, Ministry of Health and Sanitation and Ministry of Education, Science and Technology, Government of Sierra Leone (2016).
65. Department of Health. *Food-Based Dietary Guidelines for South Africa*. Cape Town: Department of Health, Republic of South Africa (2013).
66. Food and Agriculture Organization of the United Nations, Ministry Public of Health, Ministry of Agriculture, Irrigation and Livestock, Ministry of Education. *National Food-Based Dietary Guideline for Afghans*. Arg: Ministry Public of Health, Ministry of Agriculture, Irrigation and Livestock, Ministry of Education, Government of Afghanistan; Kabul: the Food and Agriculture Organization of the United Nations (FAO) (2016).
67. Bangladesh Institute of Research and Rehabilitation in Diabetes, Endocrine and Metabolic Disorders (BIRDEM). *Dietary Guidelines for Bangladesh. National Food Policy Capacity Strengthening Programme*. Rome: FAO (2013).
68. Bangladesh Institute of Research and Rehabilitation in Diabetes, Endocrine and Metabolic Disorders (BIRDEM). *Dietary Guidelines for Bangladesh (Folder). National Food Policy Capacity Strengthening Programme*. Rome: FAO (2013).
69. Chinese Nutrition Society. *Chinese Dietary Guidelines Summary*. Beijing: Chinese Nutrition Society (2016).
70. Ministry of Health. *Food and Health Guidelines for Fiji*. Suva: National Food and Nutrition Centre, Ministry of Health (2013).
71. National Institute of Nutrition. *Dietary Guidelines for Indians - a Manual*. Hyderabad: National Institute of Nutrition (2011).
72. National Coordinating Comitee on Food and Nutrition. *Malaysian Dietary Guidelines*. Putrajaya: Nutrition Division, Ministry of Health Malaysia (2010).
73. Food and Nutrition Research Institute. *Nutritional Guidelines for Filipinos: A Prescription to Good Nutrition*. Taguig: Department of Science and Technology, Republic of the Philippines (2012).
74. Nutrition division Ministry of Health. *Food Based Dietary Guidelines for Sri Lankans*. Colombo: Nutrition Division, Ministry of Health (2011).
75. Ministry of Public Health. *Manual Nutrition Flag, Healthy Eating for Thais*. Mueang Nonthaburi: Nutrition Division, Department of Health, Ministry of Public Health (2001).
76. American University of Beirut. *The Food-Based Dietary Guideline Manual for Promoting Healthy Eating in the Lebanese Adult Population*. Beirut: Faculty of Agricultural and Food Sciences, American University of Beirut (2013).
77. Ministry of Health. *The Omani Guide to Healthy Eating*. Muscat: Department of Nutrition, Ministry of Health (2009).
78. Health Promotion and Non-communicable Diseases Section. *Qatar Dietary Guidelines*. Doha: Health Promotion and Non-communicable Diseases Section, Public Health Department, The Supreme Council of Health (2015).
79. Health Promotion and Non-communicable Diseases Section. *Qatar Dietary Guidelines Folder*. Doha: Health Promotion and Non-communicable Diseases Section, Public Health Department, The Supreme Council of Health (2015).
80. Ministry of Healthy. *Dietary Guidelines for Saudis - The Healthy Food Palm*. Riyadh: General Directorate of Nutrition, Ministry of Health (2012).
81. Ministry of Health. *Food-Based Dietary Guidelines*. St John's: Ministry of Health, Antigua and Barbuda Government (2013).
82. Ministerio de Salud. *Guías Alimentarias para la población argentina - Documento Técnico Metodológico (Food-based Dietary Guidelines for Argentina 's population - Technical document)*. Buenos Aires: Ministerio de Salud (2020).
83. Ministry of Health. *The New Dietary Guidelines for Bahamas*. Nassau: Ministry of Health (2002).
84. Ministério da Saúde. *Guia Alimentar para a população Brasileira (Food-based Dietary Guidelines for Brazilian Population)*. Brasília: Secretaria de Atenção à Saúde, Departamento de Atenção à Saúde, Ministério da Saúde (2014).
85. Ministerio de Salud Publica. *Guías Alimentarias Basadas en Alimentos de la República Dominicana - Documento Técnico de Referencia (Food-based dietary guidelines for Dominican Republic - Technical Document for reference)*. Quito: Dirección de Nutrición, Ministerio de Salud Publica (2009).
86. Gobierno de la República del Ecuador, Food and Agriculture Organization. *Manual para facilitadores de las Guías Alimentarias Basadas en Alimentos (GABA) del Ecuador (Manual for Facilitating agents of Food-based Dietary Guidelines for Ecuador)*. Quito: Ministerio de Salud Pública, Gobierno de la República del Ecuador (2020).
87. Ministerio de Salud de El Salvador. *Guía Alimentaria para las familias salvadoreñas (Food-based Dietary Guidelines for Salvadoran families)*. San Salvador: Unidad de Nutrición, Ministerio de salud de El Salvador (2012).
88. Ministerio de Salud Pública y Asistencia Social. *Guías Alimentarias para Guatemala (Food-based Dietary Guidelines for Guatemala)*. Ciudad de Guatemala: Ministerio de Salud Pública y Asistencia Social, Gobierno de Guatemala (2012).
89. Ministry of Public Health. *Food-based Dietary Guidelines for Guyana*. Georgetown: Food Policy Division, Ministry of Public Health (2018).
90. Academia Nacional de Medicina. *Guías alimentarias y de actividad física en contexto de sobrepeso y obesidad en la población mexicana (Food-based Dietary and physical activities Guidelines about overweight and obesity in mexicans)*. México City: Academia Nacional de Medicina (2014).
91. Instituto Nacional de Alimentación y Nutrición. *Guías Alimentarias del Paraguay (Food-based dietary Guidelines of Paraguay)*. Asunción: Instituto Nacional de Alimentación y Nutrición, Ministerio de Salud y Bienestar Social (2015).
92. Ministerio de Salud. *Guías Alimentarias para la población Peruana (Food-based dietary Guidelines for Peruvians)*. Lima: Instituto Nacional de Salud, Ministerio de Salud (2019).
93. Ministry of Health, Social Services, Community Development, Culture and Gender Affairs. *Food-based dietary Guidelines St. Kitts and Nevis*. Basseterre: Health Promotion Unit Ministry of Health, Social Services, Community Development, Culture and Gender Affairs (2010).
94. Instituto Nacional de Alimentación y Nutrición. *Guías Alimentarias para la población Uruguaya (Food-based dietary Guidelines for uruguayan population)*. Montevideo: Área Programática Nutrición, Dirección General de la Salud, Ministerio de Salud (2016).
95. Instituto Nacional de Nutrición Fundación Cavendes. *Guías de Alimentación para Venezuela (Food-based Dietary Guidelines for Venezuela)*. Caracas: Instituto Nacional de Nutrición Fundación Cavendes (2010).
96. Ministry of Health. *Recommendations on Healthy Nutrition in Albania*. Tirana: Department of Public Health, Ministry of Health (2008).
97. National Nutrition Council. *Eating Together - Food Recommendations for Families With Children*. Helsinki: National Nutrition Council, Finnish National Agency for Education and National Institute for Health and Welfare (2019).
98. Ministry of Labor, Health and Social Affairs. *Healthy Eating - The Main Key to Health*. Tbilisi: Public Health Department, Ministry of Labor, Health and Social Affairs (2005).
99. Ministério da Saúde. *Princípios para uma alimentação saudável (Principles for Healthy Eating)*. Lisboa: Direcção Geral da Saúde, Ministério da Saúde (2005).
100. Ministry of Health. *Dietary Guidelines for Turkey*. Ankara: Food Safety Department Community Nutrition Division, General Directorate of Primary Health Care, Ministry of Health, Republic of Turkey (2006).
101. Public Health England. *Government Recommendations for Energy and Nutrients for Males and Females Aged 1 - 18 Years and 19+ Years*. London: Nutrition Science Team, Public Health England (2016).
102. Department of Health. *The Food Pyramid for Adults, Teenagers and Children Aged 5 and Over*. Co Cork: Healthy Food for Life, Nutrition Science Team (2016).
103. Health Canada. *Canada's Dietary Guidelines for Health Professionals and Policy Makers*. Ottawa, ON: Health Canada (2019).
104. U.S. Department of Agriculture and U.S. Department of Health and Human Services. *Dietary Guidelines for Americans, 2020-2025*. Washington, DC: U.S. Department of Agriculture and U.S. Department of Health and Human Services (2020).
105. Federal Government of Ethiopia, Ministry of Health, Ethiopian Public Health Institute. *Ethiopia: Food-Based Dietary Guidelines—2022*. Addis Ababa: Ministry of Health, Ethiopian Public Health Institute (2022).
106. Ethiopian Public Health Institute. *Ethiopia: Food-Based Dietary Guidelines Booklet—2022*. Addis Ababa: Ethiopian Public Health Institute (2022).

107. Ethiopian Public Health Institute. *Ethiopia: Food-Based Dietary Guidelines (Key Messages). Leaflet—2022*. Addis Ababa: Ethiopian Public Health Institute (2022).
108. Ministry of Agriculture, Livestock, Fisheries and Food. *National Dietary Guidelines and Recommendations for Healthy Diets – Gabon*. Libreville: Ministère de l'Agriculture, de l'Élevage, de la Pêche et de l'Alimentation (Gabon) (2021).
109. Totland TH, Gebremariam MK, Lien N, Bjelland M, Grydeland M, Bergh IH, et al. Does tracking of dietary behaviours differ by parental education in children during the transition into adolescence? *Public Health Nutr.* (2013) 16:673–82. doi: 10.1017/S1368890012003060
110. Movassagh EZ, Baxter-Jones AD, Kontulainen S, Whiting SJ, Vatanparast H. Tracking dietary patterns over 20 years from childhood through adolescence into young adulthood: the Saskatchewan Pediatric Bone Mineral Accrual Study. *Nutrients.* (2017) 9:990. doi: 10.3390/nu9090990
111. Monteiro CA, Cannon G, Lawrence M, Costa Louzada MD, Pereira Machado P. *Ultra-Processed Foods, Diet Quality, and Health Using the NOVA Classification System*. Rome: FAO (2019).
112. Grajeda R, Hassell T, Ashby-Mitchell K, Uauy R, Nilson E. Regional overview on the double burden of malnutrition and examples of program and policy responses: Latin America and the Caribbean. *Ann Nutr Metab.* (2019) 75:139–43. doi: 10.1159/000503674
113. Barbosa RMS, Salles-Costa R, Soares EDA. Guias alimentares para crianças: aspectos históricos e evolução. *Revista de Nutrição.* (2006) 19:255–63. doi: 10.1590/S1415-52732006000200012
114. Eicher-Miller HA, Zhao Y. Evidence for the age-specific relationship of food insecurity and key dietary outcomes among US children and adolescents. *Nutr Res Rev.* (2018) 31:98–113. doi: 10.1017/S0954422417000245
115. Montagnese C, Santarpia L, Buonifacio M, Nardelli A, Caldara AR, Silvestri E, et al. European food-based dietary guidelines: a comparison and update. *Nutrition.* (2015) 31:908–15. doi: 10.1016/j.nut.2015.01.002
116. Oliveira MS, Arceño MA, Sato PD, Scagliusi FB. Comparison of government recommendations for healthy eating habits in visual representations of food-based dietary guidelines in Latin America. *Cadernos de saude publica.* (2019) 35:311x00177418. doi: 10.1590/0102-311x00177418
117. Reddy G, van Dam RM. Food, culture, and identity in multicultural societies: insights from Singapore. *Appetite.* (2020) 149:104633. doi: 10.1016/j.appet.2020.104633
118. Guthrie J, Mancino L, Lin CTJ. Nudging consumers toward better food choices: Policy approaches to changing food consumption behaviors. *Psychol Market.* (2015) 32:501–11. doi: 10.1002/mar.20795
119. Truman E. Exploring the visual appeal of food guide graphics: a compositional analysis of dinner plate models. *Br Food J.* (2018) 2018:112. doi: 10.1108/BJFJ-02-2018-0112
120. do Amaral e Melo GR, Silva PO, Nakabayashi J, Bandeira MV, Toral N, Monteiro R. Family meal frequency and its association with food consumption and nutritional status in adolescents: a systematic review. *PLoS ONE.* (2020) 15:e0239274. doi: 10.1371/journal.pone.0239274
121. Bortolini GA, Moura AD, de Lima AM, Moreira HD, Medeiros O, Diefenthaler IC, et al. Guias alimentares: estratégia para redução do consumo de alimentos ultraprocessados e prevenção da obesidade (Food guides: a strategy to reduce the consumption of ultra-processed foods and prevent obesity). *Revista panamericana de salud publica.* (2019) 43:e59. doi: 10.26633/RPSP.2019.59
122. Jardim MZ, CostaBVL, Pessoa MC, Duarte CK. Ultra-processed foods increase noncommunicable chronic disease risk. *Nutr Res.* (2021) 95:19–34. doi: 10.1016/j.nutres.2021.08.006
123. Elizabeth L, Machado P, Zinöcker M, Baker P, Lawrence M. Ultra-processed foods and health outcomes: a narrative review. *Nutrients.* (1955) 2:12. doi: 10.3390/nu12071955
124. Cheng AC, McDonald JR, Thielman NM. Infectious diarrhea in developed and developing countries. *J Clin Gastroenterol.* (2005) 9:757–73. doi: 10.1097/01.mcg.0000177231.13770.07
125. Riahi M, Mohammadi AA, Moghadam VK, Robati ZS, Bidkhorji M. Diarrhea deaths in children among countries with different levels of the human development index. *Data Brief.* (2018) 17:954–60. doi: 10.1016/j.dib.2018.02.019
126. World Health Organization. *Guideline: Sugars Intake for Adults and Children*. Geneva: World Health Organization (2015).
127. World Health Organization. *Report of the Commission on Ending Childhood Obesity*. Geneva: World Health Organization (2016).
128. Alves MD, Souza AD, Barufaldi LA, Tavares BM, Bloch KV, Vasconcelos FD. Padrões alimentares de adolescentes brasileiros por regiões geográficas: análise do Estudo de Riscos Cardiovasculares em Adolescentes (ERICA). *Cadernos de saúde pública.* (2019) 35:311x00153818. doi: 10.1590/0102-311x00153818
129. Yan Y, Mi J. Noncommunicable chronic disease prevention should start from childhood. *Pediatric Investig.* (2021) 5:3–5. doi: 10.1002/ped4.12254
130. Nilson EAF, da Silva EN, Jaime PC. Developing and applying a costing tool for hypertension and related cardiovascular disease: attributable costs to salt/sodium consumption. *J Clin Hypertens.* (2020) 22:642–8. doi: 10.1111/jch.13836
131. World Health Organization. *Salt Reduction*. (2020). Available online at: <https://www.who.int/news-room/fact-sheets/detail/salt-reduction> (accessed October 4, 2022).
132. World Health Organization UNICEF. *Global Strategy for Infant and Young Child Feeding*. Geneva: World Health Organization (2003).
133. Williams MPH, Namazova-Baranova L, Weber M, Vural M, Mestrovic J, Carrasco-Sanz A, et al. The importance of continuing breastfeeding during coronavirus disease-2019: in support of the world health organization statement on breastfeeding during the pandemic. *Pediatrics.* (2020) 223:234–6. doi: 10.1016/j.jpeds.2020.05.009
134. Spaniol AM, Da Costa TH, Bortolini GA, Gubert MB. Breastfeeding reduces ultra-processed foods and sweetened beverages consumption among children under two years old. *BMC Public Health.* (2020) 20:330. doi: 10.1186/s12889-020-8405-6