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DESIGNING AND VALIDATING AN EFFECTIVE ICONOGRAPHY FOR THE DISSEMINATION OF FOOD-BASED DIETARY GUIDELINES IN PERU: A QUALITATIVE STUDY

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ABSTRACT

Changes in dietary patterns towards Western diets, along with unhealthy lifestyles, are causing a rapid increase in the rates of overweight, obesity, and non-communicable chronic diseases in the Peruvian population. Food-based dietary guidelines (FBDG) are supportive tools for public policies aimed at promoting healthier eating habits. This study aimed to present the process of designing and validating an iconography for the Peru FBDG. The design process involved an extensive review of dietary iconography in various countries of the LAC region. In accordance with the specific context of Peru, the decision was made to incorporate local elements into the iconography. Four image proposals were initially designed and subsequently subjected to expert validation. From these, two proposals were selected for population validation through focus groups. The validation process focused on qualitative evaluation criteria, including understanding, attraction, involvement, acceptance, and induction to action. The resulting final iconography consists of two concentric circles. The central circle represents the seven food groups distributed proportionally, while the outer circle signifies healthy lifestyles, encompassing physical activity, commensality, and daily water consumption, portrayed in vibrant colors. Surrounding the circles are icons representing ultra-processed foods depicted in black octagons. Additionally, icons for added sugar and salt are placed outside the circles, serving as prominent warnings to reduce their consumption, as recommended during the validation process. This study successfully developed an iconographic representation that fulfills both technical and population-level validation criteria. The incorporation of participants' contributions and recommendations further enhanced its efficacy. The validated iconography not only serves as an educational and awareness tool but also offers practical guidance for individuals to adopt healthier dietary practices and lifestyles. In conclusion, the FBDG iconography effectively communicated the importance of natural foods over ultra-processed ones, along with emphasizing healthy eating habits, as understood and embraced by focus group participants. The attraction and comprehension of the FBDG iconography looks promising for its implementation, suggesting improvements in the health and nutritional well-being of individuals of two years and above.

Key words: Iconography, dietary guidelines, food and nutrition education, healthy lifestyle, Peru dietary guidelines

INTRODUCTION

The Food-Based Dietary Guidelines (FBDG) for the Peruvian Population, officially approved by the Ministry of Health in 2018, were crafted with reference to the international commitments embraced by the Peru State, following international recommendations and contributing to the principles of healthy and sustainable diets [1-3]. This effort occurs within a national context marked by the dual challenge of malnutrition and unhealthy dietary patterns [4-6].

In Peru, the juxtaposition of malnutrition and unhealthy eating habits poses a significant public health challenge. Stunting (11.7%) and anemia (33.6%) in children under five years old, along with anemia prevalence in women of childbearing age (20.6%), constitute key nutritional concerns [5]. Moreover, there is a notable surge in overweight and obesity across all age groups, with 63.1% of individuals aged 15 and above dealing with excess weight and 25.6% grappling with obesity [6]. Notably, Peruvian dietary habits are characterized by low fruit and vegetable consumption, with individuals aged 15 and older averaging 4.4 and 3.2 days per week, respectively [4]. The average daily fruit intake stands at 2.0 portions, while daily vegetable salad consumption amounts to 1.13 portions. Only 10.5% of the population manages to consume at least five portions of fruits or vegetables per day [4]. International recommendations suggest 400 g per day of fruits and vegetables, which means at least five portions per day [7].

Recent studies have underscored troubling consumption patterns of ultra-processed products in Peru [8], emphasizing the urgent need for interventions encouraging healthier dietary habits. To address these challenges, the Peru FBDG was formulated based on six principles, incorporating twelve educational messages to advocate for healthy eating practices and lifestyles [9]. This initiative reflects a shift towards promoting healthier dietary choices among the Peruvian population, aiming to combat the prevalent malnutrition and unhealthy diets [10,11].

The FBDG iconography aimed to encourage the combination of foods from these groups in meals [12]. It is important to note that these graphs did not include recommendations regarding water consumption, physical activity, or communal eating. The efforts to design graphics at that time had a common theme: they were used as Food and Nutrition Education (FNE) tools under the nutritional theme. These graphics guide and represent what and how much to eat daily according to each food group [12,13]. This is an approach used in the development of the Food Pyramid for the US Food Guide [13]. Unfortunately, there were few efforts to evaluate these graphics, which did not allow for a more detailed discussion of the results they could have achieved.

In Latin America and the Caribbean (LAC), as described by the FAO, the graphic representations that accompany the FBDG have adopted diverse forms [10]. These graphics share common elements related to the culture of each country, the concept of a variety of foods, the grouping of these foods (presenting between six to seven groups), sustainability, and aspects of proportionality, among others. In many countries, the graphics, in addition to representing food groups, included the concept of physical activity [2,10]. In some of them, the concept of water consumption was included [10]. More recently, the graphics of Costa Rica, Ecuador, and Mexico included elements related to the food system, sustainability, family farming, and fishing [14-16]. These graphics allude to the importance of consuming minimally processed foods, without warning seals, and of local production [14-16]. Likewise, in other regions of the world, priority has been given to the development of FBDG and their graphics, which highlight the proportion of foods to be consumed [17].

In this context, the CENAN, of the Peruvian National Institute of Health has taken on the objective of designing and validating an iconography representation of the FBDG [9]. This representation aims to educate the population on making healthy choices in their nutrition, identifying natural foods, and understanding the proportion of different food groups. It is complemented with other healthy practices and simultaneously recommends avoiding the consumption of ultra-processed foods [18]. The objective of this article is to describe the process followed for the design and validation of an iconography representation of dietary guidelines as a complementary educational tool to promote healthy eating and lifestyles for the Peruvian population.

MATERIALS AND METHODS

A qualitative, observational, and descriptive investigation was conducted to design and validate the iconography of the FBDG. This article followed the standards for reporting qualitative research (SRQR) checklist [19]. The process was carried out by the CENAN technical team, which led the development of the FBDG, and received technical assistance from a team of communication consultants. These consultants were responsible for the design and communication validation at two levels: technical and population. The process of preparing and validating the iconography representation of FBDG took place between August and December 2018. Figure 1 displays the process of designing, developing, and validating the iconography material for the FBDG.

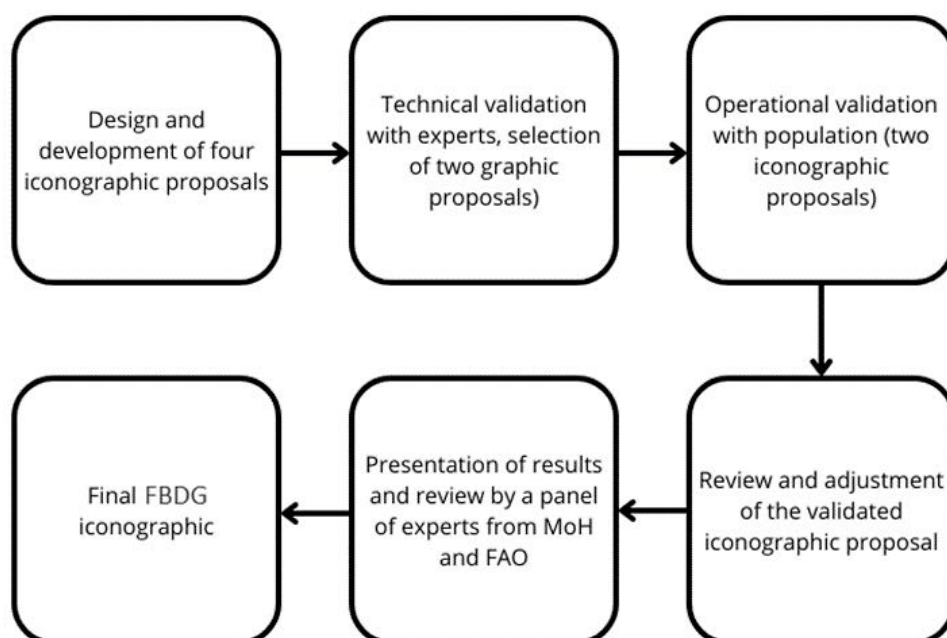


Figure 1: Process of designing, developing, and validating the iconography material for the FBDG in 2018. MoH: Ministry of Health; FBDG: food-based dietary guidelines

Nonprobability Convenience sampling was used to employ in the select the population. This decision was made because the participants belonged to the medium and low socioeconomic levels. Validation sessions were held in various locations, including public schools, health facilities, technical education institutes, and district, provincial, and regional government headquarters. Using the UNICEF methodological guide, a communication consulting team, composed of social communicators, conducted 40 discussion sessions using focus groups [20]. These groups involved approximately 390 people (Table 1). Each session started with the individual presentation of icons representing healthy foods, commensality, physical activity, and ultra-processed foods. Following this, iconography proposals that included these icons without any text were presented, finally, the complete version of the graphics, which included both the icons and the corresponding text.

At this phase, a search was conducted for a variety of FBDG icons employed by countries in the region with their respective dietary guides. This exercise allowed us to understand the intent to visualize food groups, the proportion of their consumption, and the promotion of healthy practices and lifestyles. These practices include: drinking water, engaging in physical activity, and avoiding products with nutritional warning labels. The FBDG iconography also emphasized reducing the consumption of sugar and salt and included warnings against the consumption of ultra-processed products, among other relevant aspects. This is consistent with international trends in graphic representations [21].

In this context, the CENAN technical team analyzed each of the technical criteria described above and incorporated them into the preparation of the food graph proposals. They also considered other aspects such as commensality, front nutritional warning labelling with seals for ultra-processed products due to their high content of critical nutrients, such as sugar, sodium, saturated fat, and trans-fat [22]. The decision was made not to use images or photographs of food, as it was difficult to identify them when the amount of food was too large per group. Given the existing dietary and regional diversity, it was anticipated that this situation would likely arise with the design of the proposal [23].

With these technical considerations in mind, the communication consulting team designed the graphic proposals using elements in an iconography format. By their nature, these elements allow the establishment of an idea, concept, category, or relationship of similarity. In addition, they are intuitive, universal, and easily understandable. From this, four proposals for food charts were prepared for validation with experts [24]. All of them emphasized the following: 1) Prioritizing the consumption of natural foods, practicing a healthy lifestyle, and avoiding the consumption of ultra-processed foods; 2) Helping to recognize food categories, rather than individual foods; 3) Differentiating positive practices so that they form a unified and colorful representation, while negative practices are presented disjointedly and in black and white.

Validation meetings were conducted with the participation of experts and representatives from the Ministry of Health, Ministry of Agriculture and Irrigation, Ministry of Education, Professional Associations, Public and Private Universities, Societies, and Institutions that conduct nutrition research, as well as representatives from FAO and UNICEF in Peru. During the validation meetings, the four proposals were presented in full color and printed in A3 format.

With the group of experts, the questions were grouped into two levels: 1) the technical level, which refers to the structure of the proposal and its relationship with the messages of the dietary guides; and 2) the communication level, which validates the design, icons, colors used, and the didactic aspect of each proposal. With the contributions from the group of experts, it was possible to reach a consensus on two proposals to be validated with the population, both in Spanish. Figure 2 displays two panels (Panel A: Food Circle Chart; and Panel B: Food Plate Chart representing the FBDG iconography versions to be validated).



Panel A: Food Plate Chart (FPC)



Panel B: Food Circle Chart (FCC)

Figure 2: FBDG iconography versions to validate

The validation of the graphs at the population level was conducted using a qualitative approach. This approach encompassed the criteria of understanding, attraction, involvement, acceptance, and induction to action [25]. It enabled us to explore the participants' perceptions and expectations of the individual iconography and the graphics. It also allowed us to gather recommendations that align with the established criteria.

The qualitative research technique used was focus groups, which involved participants of various age groups: children, adolescents, young people, adults, and older adults. The process took place in urban areas of several cities: Metropolitan Lima, Trujillo (La Libertad), Huancayo (Junín), and Iquitos (Loreto).

The development of the FBDG was a mandate from the Government of Peru. This mandate was carried out by the Ministry of Health through the INS/CENAN. It involved direct activities with communities, including conducting focus groups to validate the graph and collect data. The FBDG is supported by Ministerial Resolution 1353-2018/MoH, which approves the technical document: Dietary Guides for the Peruvian Population. At the onset of each focus group session, informed consent was obtained from the participants including girls, boys, and adolescents through their parents and the educational authorities of each participating educational institution. After being explained for the purpose of the activity and that their participation was voluntary.

Each focus group session was recorded in an audio format and subsequently transcribed into a Microsoft Excel template. The transcription process adhered to rigorous qualitative criteria aimed at ensuring a comprehensive analysis of the data. These criteria encompassed understanding the participants' responses, fostering engagement and involvement, accepting diverse perspectives, and facilitating action-oriented insights. The analysis was based on three aspects: 1) The iconography used; 2) The graphics without text; and 3) The graphics with text.

RESULTS AND DISCUSSION

The validation process involved both experts and the general population. Consensus among experts was reached in selecting two graphic proposals with high educational potential. Participants recognized that the concept of gender equality was represented in the silhouette icons within the healthy lifestyles section. During the validation, a discrepancy emerged regarding the inclusion of the group of sugars and derivatives. This led to the development of alternative versions of the proposals that excluded this group.

Participants easily identified and recognized the various food groups, such as fruits, vegetables, dairy products, meats or animal products, flours or cereals, tubers, dry

pulses, oils, sugars, and water. The version of the dry pulses' icon called "saquitos," representing bags of natural food, was preferred by most groups due to the flexibility in representing different types of known pulses or regional varieties such as lentils, beans, Lima beans [*Phaseolus lunatus*] a kind of local pulse, or chickpeas. Furthermore, this version represents the common way these items are sold in bulk in local markets.

Participants commonly chose the trio of vegetable oil, avocado, and olive oil as alternatives for vegetable fat. There was difficulty in identifying oilseeds combined with oils as a source of vegetable fat. Participants agreed on the colors used for the icons, associating them with nutritious, healthy, and natural foods, while contrasting with junk food, packaged foods, and instant foods.

The sequencing aspect related to commensality was easily identified by most participants without significant issues. However, only in certain focus groups recognized the icon representing the choice and purchase of food, although this recognition was slightly delayed. Despite this, all groups unanimously agreed that the sequence promotes a positive practice. This practice signifies knowledge, responsibility, and affection from parents towards their children and stands in opposition to the consumption of junk food.

Participants had no difficulty in identifying all the icons related to physical activity. However, the icon representing tai chi was occasionally misconstrued as referring to other sports or physical practices like karate, kung-fu, aerobics, or gymnastics. This misinterpretation was less common among older adult groups. Many groups agreed that the tai chi icon represents activities integrated into daily life and recreation, implying the need for training. There was a unanimous consensus across all focus groups regarding the importance of staying physically active. This is seen as crucial to avoid a sedentary lifestyle, which can contribute to issues like overweight, obesity, and other health concerns. The groups perceived these activities as positive, necessary, and something attainable.

Regarding ultra-processed foods, most participants easily identified the icons. However, in three groups of children and two groups of adults, there was a slight delay in identifying the icon for instant soup. This icon was initially associated with wonton soup, a common dish made with Chinese ingredients. The remaining groups immediately recognized a commercial brand of instant soups that is marketed in the country. The participants acknowledged that Ultra-Processed Foods contain excess fat, sugar, flour, and salt. They also highlighted that Ultra-Processed Foods are artificial and manufactured. They contain flavorings, colorings, preservatives, among other things. '*It's pure chemistry,*' they commented.

In relation to the food circular chart (FCC) without text, all groups easily recognized and understood the graph, including the meaning of the blocks and their relationships. They identified the inner circle as a recommendation for daily consumption, with proportions depicted in the image. There was consensus that oil and sugar should be consumed in smaller amounts. Many participants recognized the icons representing commensality, physical activity, and water consumption in the outer circle. They understood the connection between these icons, emphasizing the importance of making good decisions regarding food, exercise, and hydration. The groups also associated the black color used for the Ultra-Processed Foods icons with negative concepts such as mourning and death. The octagonal shape of the iconography was compared to a universally recognizable traffic "STOP" sign. They acknowledged the complementary nature of both circles, understanding that being healthy involved choosing natural foods, cooking them at home, and enjoying meals as a family. The groups also recognized the need to complement these practices with physical activity and adequate water intake.

Regarding the food plate chart (FPC) without text, many groups recognized the graph and understood its purpose. Participants identified the central image as representing a plate aimed to establish dietary proportions. There was a consensus among all groups that the recommended proportions include half a plate of vegetables, a quarter for food of animal origin, and a quarter for cereals. It was also understood that tubers and beans could be substituted or combined with cereals, while maintaining the recommended proportions. Participants frequently commented that the graph emphasized the importance of consuming more vegetables. Additionally, all groups highlighted the recommendation of consuming fruits three times a day, dairy products twice a day, as well as small amounts of oil and minimal sugar intake.

When the graphs were presented with text, they clarified the recommended amounts of physical activity and water intake. The text also specified that the common blocks in both graphs represent a healthy lifestyle and the avoidance of ultra-processed foods. The term "ultra-processed foods" was unfamiliar to all groups, but they associated it with negative concepts related to "*junk food*." Participants identified high sugar, saturated fats, trans fats, and sodium as negative attributes in food products. They associated sugar with diabetes and saturated fats with increased cholesterol. There was a general lack of knowledge about the meanings of terms like "*saturated fatty acids*" and "*trans fatty acids*," with these terms being associated with negative and artificial aspects, respectively. Initially, not all groups immediately recognized the relationship between sodium and salt, but after explanation, they associated it with high blood pressure. It is important to note that primary school children were an exception, as they did not spontaneously make the association.

After a debate, the groups mostly chose the FCC as their preferred option. They found it to be clear, visually appealing, and suitable for promotional purposes. Towards the end, two alternate versions of the FCC were presented, focusing on sugar and salt. One version excluded sugar altogether, while the other included an icon indicating the need to reduce sugar and salt consumption, accompanied by a minus sign. The first version was rejected by the groups, as they argued that even a minimal amount of sugar is necessary. They believed that excluding the sugar group entirely would overlook the importance of reducing its consumption. A common sentiment expressed was that the sugar group should be present, even if it is to emphasize consuming it in moderation.

Participants asked about the potential redundancy of having the '*sugar*' group in the inner circle alongside the icon to reduce its consumption, participants did not express objections, instead they perceived it as positive reinforcement. Regarding the salt icon, most groups preferred the navy-blue background on light blue turquoise, as it symbolized the origin of salt from the sea and enhanced the shape of the icon making it more distinguishable. When asked about the representation of the salt icon in terms of quantity, the general response was 'a little bit' or 'a pinch.' Further information can be found in Table 2 and Figure 3.



Figure 3: FBDG iconography final version

The objective of this study was to describe the design and validation process of the FBDG iconography. The FBDG graphic serves as a complementary educational tool aimed at promoting healthy eating and lifestyles for the population, to accompany the 12 key messages of the Peruvian dietary guidelines (Table 3). Promoting healthy eating habits and lifestyles is of great importance for the population, considering the increasing prevalence of non-communicable diseases (NCDs), overweight, obesity and unhealthy eating habits [17,26-28]. With approximately 82% of the population residing in urban areas [29], it becomes crucial to develop effective educational materials, such as the FBDG iconography, to improve the nutrition and well-being of individuals.

Findings regarding the favorable response and understanding of the FCC align with similar studies on the development and validation of graphic information for the population. Previous research has demonstrated that the use of graphics enhances comprehension and facilitates information delivery [30-32]. Bacher *et al.* [30] used a panel of experts to develop an information leaflet for radiology patients. For content validation, the authors ran a trial with 632 participants and emphasized the need to apply scientific methods in the development, design, and evaluation of material aimed at patients [30]. Similarly, Tudor *et al.* [31] reported the development of content based on a panel of nutrition experts in a study on the validation of a teaching guide with infographics aimed at teachers. They validated this with 22 teachers from Panama. The authors highlighted the importance of designing and validating educational materials on food and nutrition topics by applying scientific methods [31]. It's important to note that the FBDG graph was carefully designed through an ad hoc technical committee. Following international recommendations, the graph underwent a validation process with different audiences.

Moreover, it is worth mentioning that Ramirez-Zea *et al.* [32] conducted a qualitative study utilizing focus groups to explore the knowledge and perceptions regarding high blood pressure risk, healthy lifestyles, and mobile phone usage in three LAC countries. The study shed light on the participants' understanding of the correlation between salt consumption and the risk of developing high blood pressure. This awareness is significant as it underscores the recognition of the impact of dietary choices on health conditions such as HBP. Similarly, in a qualitative study conducted in Peru, Vera Ubillús *et al.* [33] examined the myths and beliefs surrounding insulin therapy in patients with diabetes and their relatives. Employing focus groups and in-depth interviews, the researchers identified various beliefs and myths held by the participants, particularly concerning the treatment and management of the disease. These findings provide further confirmation that within these populations, there exists an understanding of the link between sugar consumption and the development of diabetes. Infographics play a crucial role in healthcare communication [34].

Therefore, further studies employing qualitative approaches are key to enhancing the understanding and validation of infographic materials about healthy eating habits.

The design of educational materials lacks value if end users cannot understand or internalize them. Therefore, validation is essential [35], as it enables identification of the points of the educational material that attract attention and those that generate discomfort for its understanding in the target population. Differences of opinion between the participants can also be identified, depending on the material applied and its context [36]. Another important aspect is the identification of the final message or reflection of the material, which is crucial if it manages to generate a change in the perception or behavior of the population [37]. It is important to highlight the need to integrate the FBDG, as well as its graph, in population interventions such as social protection policies and programs [38]. The validation carried out contributes significantly to the harmonization of nutrition-sensitive policies and policy instruments.

The validation process revealed that the final design of the image that accompanied the dissemination of the FBDG was completely aligned to the preferences and needs of the potential user public. This alignment considered the social, cultural, and educational characteristics of the potential users to achieve better acceptance upon dissemination and implementation. With respect to processed foods, it is worth discussing the fact that the population has a greater understanding when referring to them as foods and not as products. For the participants, food is everything we can eat.

On the other hand, the importance of continuous evaluation has been emphasized to ensure that materials are continually improving in quality and effectiveness [39]. This entails periodically searching and updating these materials in line with the current nutritional and epidemiological profile, as well as adapting to new developments in communication and educational technology. The proposed iconography approach for the dissemination and implementation of the FBDG prioritizes the use of visual elements throughout. This deliberate choice stems from the recognition of the current global landscape of technology and communication, which necessitates a solution that is intuitive, representative, and concise. In both technical and population validations, these characteristics have consistently been validated, underscoring their significance in the selection process.

It is crucial to highlight the uniqueness of this proposal, as it stands as the pioneering venture within the collection of images accompanying food guides in various LAC countries. Considering this distinctiveness, the proposal deserves fair recognition and opportunities to contribute to the generation of positive changes in health and

nutrition. Embracing this innovative approach can pave the way for enhanced understanding, engagement, and impact in promoting healthier lifestyles and dietary practices within the population.

To ensure the effectiveness of the FBDG iconography in disseminating and implementing the food guides, the author recommends the development of a strategic plan that includes comprehensive implementation, monitoring, and evaluation. Collaboration between various sectors, including the health sector, public and private sectors, civil and scientific societies, professional associations, and media, is essential. These collaborations will facilitate the education and widespread adoption of healthy eating practices, ultimately enhancing the quality of life for the population. Additionally, the creation of tailored communication materials, considering factors such as age group, area of residence, and natural region. The goal is for these materials to become applied tools that support nutritional education, dietary consultation, and comprehensive healthcare [40].

The main strength of the present study has been the number of focus groups, which were distributed equitably. This allowed different age groups to be characterized, from childhood to older adulthood. These groups belonged to the three natural regions of the country - coast, mountains, and jungle - in addition to the city of Metropolitan Lima, which has a greater population concentration. When compared to similar experiences described in the region, this study is considered one of the largest samples. Another strength has been the use of iconography, which allowed participants to identify categories before individual elements. This can be taken as a guideline for future validation of food graphs. The findings of the present work must be analyzed considering its limitations. While our study included a diverse range of age groups and geographic regions, it is important to acknowledge that the sample predominantly consisted of individuals from urban areas and specific socioeconomic levels (C and D). As a result, the perceptions of the rural population were not represented, limiting the generalizability of the findings in that context. Future research should strive to include a more representative sample to capture a broader perspective.

CONCLUSION AND RECOMMENDATIONS FOR DEVELOPMENT

In conclusion, the FBDG iconography representation, which illustrates the recommended food groups and promotes healthy lifestyle practices like drinking water and engaging in daily physical activity, was well understood, and accepted by the participants in the focus groups. The iconography effectively conveyed the message of prioritizing natural foods and avoiding ultra-processed foods, while also emphasizing the importance of communal eating. The positive reception and comprehension of the FBDG iconography are promising for the implementation of

the guidelines with the goal of improving the health and nutritional status of the population aged two and above.

It is recommended to implement a rigorous design and validation exercise of the infographic material of the dietary guidelines. The material should be clear and precise to communicate guidance on food and nutrition to the general population. The material can be supplemented with complementary validated educational materials aimed at different audiences such as schools, hospitals, food markets, and even commercial spaces. Dietary guidelines are a package of tools to support public policies in favor of healthy diets, a coordinated and articulated effort is required among the different actors in the inter-institutional committee of dietary guidelines that goes beyond design, with empowerment being fundamental in the phases of monitoring, evaluation, and updating of the dietary guidelines.

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CONFLICT OF INTEREST STATEMENT

All authors declared that there are no conflicts of interest to disclose.



Table 1: Characteristics of the population participating in the validation

Age group	Characteristics
Girls and boys aged 8 to 11	Refers to students attending public educational institutions who are in grades 4 to 6 of primary education.
Adolescents aged 15 to 17	Includes women and men who are students at public educational institutions and attend grades 3 to 5 of secondary education.
Young people aged 20 to 29	Encompasses both women and men with at least a complete secondary education level. They attend health services provided by the Ministry of Health establishments.
Adults aged 30 to 59	Refers to women and men who have completed at least secondary education. They also utilize health services offered by the Ministry of Health establishments.
Seniors aged 60 or older	Includes women and men who have completed at least secondary education. They, too, seek health services from the Ministry of Health establishments.

Source: Created by the authors

Table 2: Evaluation of Understanding, Attraction, Involvement, Acceptance, and Induction to Action Criteria

Criteria	Comments
Comprehension	During the debate, the groups unanimously selected the circular food chart as their preferred option. They found it to be clear, visually appealing, and suitable for promotional purposes. Interestingly, two alternate versions of the circular food chart—one focusing on sugar and the other on salt—were presented. The version excluding sugar was rejected because the groups believed that even a minimal amount of sugar is necessary. Excluding it would undermine the importance of reducing overall sugar consumption. Participants emphasized the need to include the sugar group, even if only to emphasize moderation.
Attraction	Across all groups, the design was aesthetically pleasing, thanks to the judicious use of color and consistent layout. Notably, the Food Pyramid Chart (FPC) stood out as the most visually striking option due to its larger icons and easy comprehensibility, even from a distance.
Involvement	All groups recognized that the graphics were tailored to their needs and facilitated informed decision-making related to health care. Furthermore, it effectively sparked interest and fostered conversations about healthy eating.
Acceptance	Participants from all groups viewed the recommendations positively, considering them both feasible and essential—not only for their individual well-being but also for their entire families.
Induction to Action	Participants acknowledged that the graph encouraged a shift in their approach to consuming Ultra-Processed Foods within their households.

Source: Created by the authors

Table 3: Key messages of the Peru dietary guidelines

Dimension	Key messages
Prefer and choose natural foods as the basis of your diet and avoid ultra-processed foods. Prepare meals and dishes with natural foods and draw on Peru's rich and varied culinary tradition. Practice a healthy lifestyle.	Choose and enjoy the variety of natural foods available in your locality every day. Reduce the consumption of processed foods to protect your health. Protect your health by avoiding the consumption of ultra-processed foods. Add color and health to your life by consuming fruits and vegetables daily. Strengthen your body and mind by eating animal-based food daily, such as meats, offal, blood sausage, fish, eggs, and dairy products. Don't miss out on legumes; they are tasty, very healthy, and can be prepared in many ways. Take care of your health; avoid being overweight by reducing the consumption of sugar in your meals and drinks. Take care of your weight by consuming rice, bread, and pasta in moderation. Avoid high blood pressure by reducing the use of salt in your meals. Stay healthy by drinking 6 to 8 glasses of water per day. Keep your body and mind active and alert, practice at least 30 minutes of physical activity every day. Prefer home-made meals and enjoy them in company.

Source: Created by the authors

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