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Staple principles for the definition of front-of-pack nutritional labels

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ABSTRACT

Front-of-pack nutrition labels (FOPNLs) have been developed since 1989 to curb the increasing prevalence of obesity and non-communicable diseases (NCDs) and to promote healthy consumption choices. While several countries have introduced their own labeling schemes on a voluntary basis, the European Commission aims to harmonize a FOPNL system that will be mandatory for all member states. This paper summarizes a contribution to the current debate on FOPNLs from Italian and Spanish researchers working in the fields of human nutrition, nutritional epidemiology and public health education and communication policy before the final decision on FOPNLs to become mandatory in Europe is taken.

1. Introduction

Front-of-pack nutrition labels (FOPNLs) and their underpinning Nutrient Profiling Systems have been developed since 1989 to counteract the rising incidence of obesity and diet-related non-communicable diseases (NCDs) in Western countries and other regions [1]. Voluntarily, several countries have already adopted one FOPNL, contributing to a heterogeneous scenario. Consequently, the European Commission aims to harmonize a FOPNL system that can become mandatory for all Member States.

It is well-known that obesity and NCDs have a multifactorial etiopathogenesis, and it is unlikely that a single prevention strategy will significantly change the risk of becoming ill; however, providing information and guidance to consumers could be a first step to moving towards healthier food choices and improved eating behaviours [2].

Since 2004, the World Health Organisation (WHO) has proposed FOP labelling "as a tool for promoting healthy diets and preventing obesity and diet-related NCDs," providing recommendations for FOPNL models to be adopted and suggesting that they should be supported by a communication strategy and monitoring actions [3].

When a FOPNL system is being developed, two essential points must be taken into consideration:

1. Individuals do not eat isolated nutrients or ingredients; however, they consume foods and composite meals consisting of complex combinations of multiple nutrients and non-nutritive bioactive compounds, which are likely to interact synergistically or

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antagonistically on nutrient absorption, bioavailability, utilization, and health effects.

2. How the system impacts consumers' perception of the product's healthiness: there is evidence that, while nutrition claims may lead some consumers to improve their nutrition knowledge and select healthier options, it may also lead consumers to increase food consumption and overall energy intake. Extreme attention is therefore required to limit this risk.

Food is more than a sum of nutrients; it is not just mere "fuel and bricks for the body." [4]. Furthermore, eating is deeply rooted in culture and has critical social implications. FOPNLs should positively emphasize the importance of dietary patterns that have a proven record of healthiness and are typified by a long-standing contribution to the benefits of commonality, culinary legacy, and food traditions.

This document contributes to the current debate on FOPNLs from Italian and Spanish research groups dealing with nutrition issues, nutritional epidemiology, and public health education before a final decision on the FOPNLs is to be reached and adopted mandatorily in Europe.

2. Principles of FOPNLs

The following principles were developed through a structured discussion and a final onsite workshop held in Rome on December 13, 2023.

1. The FOPNLs should aim to inform consumers about adopting healthier eating behaviours.

The most recent scientific research has confirmed and remodelled the relationship between diet and health. According to the Global Burden of Disease (GBD) study group, which analysed 286 causes of death and 87 risk factors in about 200 countries and territories of the world, diet-related risk factors were altogether responsible, in 2019, for 13.5 and 14.6 % of all female and male deaths, respectively (about 46 % of cardiovascular disease deaths and 8 % of cancer deaths in countries with high socio-demographic index). The incidence and prevalence of obesity and NCDs, such as cardiovascular diseases, cancer, chronic respiratory diseases, intestinal, neurodegenerative, non-alcoholic fatty liver diseases, and type 2 diabetes, are rising significantly, with a detrimental impact in terms of morbidity, mortality, and quality of life [5].

Dietary habits play a pivotal role in these worrying epidemiological trends, representing an essential aspect of overall lifestyle. Providing information to consumers on what constitutes healthy eating can positively affect dietary choices.

It has also to be considered that the evidence supporting a potential role of FOP labelling systems in reducing NCD risk is primarily derived from observational and retrospective studies. As is well known, such studies do not allow for the establishment of causal relationships. In the absence of intervention studies (which are admittedly challenging to conduct), definitive proof is lacking that the adoption of such a system would lead to a reduction in cardiovascular events within the population.

Furthermore, climate change is currently a major issue to be considered [6]. Foods and their production and consumption patterns can play a paramount role in addressing this phenomenon. Even so, it is not easy to consider this dimension into account when developing a FOPNL. Neither can it be helpful to stick different labels on the package without falling into the paradox of choice.

The issue can be, at least partially, resolved, considering that promoting a healthy dietary pattern typically also entails promoting a sustainable one (*e.g.*, the Mediterranean Diet and the Nordic Diet) [7,8]. In short, it appears difficult to promote healthier habits through mere labelling.

2. *The most effective strategy for informing consumers can integrate "positive" and, in some cases, "negative" nutrition* approaches *to promote healthy food choices.*

The Global Burden of Disease study clearly shows that, except for high dietary intake of energy and sodium, the primary dietary risk factors associated with deaths are related to low consumption of certain food groups, such as fruit, vegetables, seeds, nuts, and legumes [5]. Thus, on the one hand, positive communication, positive feelings about the goals, and coping techniques to increase response efficacy and self-efficacy all seem crucial in promoting health-conscious actions, better than communication-based on the demonisation of specific foods/food groups [9,10]. On the other hand, because of the risk of overconsumption of some unhealthy (when eaten in excess) nutrients, such as sugars and saturated fats, a negative approach to nutritional advice should be considered in some cases (see warning labels experience in Chile). Therefore, focusing on positive "to-do" in association, in some cases, with "not-to-do" behaviours can arguably increase the number of people adopting healthier eating habits [11].

3. The information provided by FOPNLs must aim to enable users to make informed choices (consumer empowerment).

The Regulation (EC) 1924/2006 (on nutrition and health claims made on foods) and Regulation (EU) 1169/2011 (the Food Information to Consumers or "FIC") harmonize the food labelling system in the EU. Requirements for the implementation of food labels (and therefore of a FOPNL on a large scale) include that they should not be false or ambiguous, they should not give rise to doubt about the safety and/or nutritional adequacy of foods, they should not encourage or condone excess consumption of a particular food or refer to changes in bodily functions, and they should enable consumers to make an informed choice [2].

Recent research has pointed out that, despite the initial high expectations, directive FOPNL effectiveness in promoting a healthy and balanced diet should be scaled down (although the efficacy of small achievements obtained on large-scale populations from a long-term perspective, particularly when attained in disadvantaged population subgroups, has to be verified) [8,12–14].

4. FOPNLs should represent the complexity of the overall human nutrition.

Admitting the complex mixture of foods/ingredients and the meal contents, if we focus our attention on the percentage content of total and saturated fats, sugars, or salt in a specific food, we neglect the role of those nutrients in the overall dietary pattern, potentially attributing them a solely wrong meaning. One food is a very small part of daily consumption and cannot significantly change the overall diet, regardless of the quantity consumed [4]. Furthermore, it is important to consider the frequency of consumption and the overall impact of a given food on a diet: a type of food is not only what it contains but, above all what, it displaces since the choice to consume a particular food will exclude other food categories [15]. Current FOPNLs fall short of addressing this issue and an appropriate one might never be developed.

An information campaign that emphasizes single nutrients and their combination within individual foods ignores the relevance of essential micronutrients (i.e., vitamins, minerals and other bioactive compounds), the potential influences related to the frequency of consumption, the effect of the food matrix, the synergistic/antagonistic interactions among food items and their components, and the further transformations occurring during preparation and cooking processes. In particular, a communication approach that simplistically summarizes and limits information to a single ingredient or nutrient must capture the complexity of dietary patterns. On the contrary, informative FOPNLs have the advantage of putting the label information in a comprehensive

dietary context of daily intake and recommendation.

In this context, EFSA-endorsed nutrition claims could have an additional role in the information delivered as FOPNL [16]. The advantage of this type of communication consists of having been already approved by the EU and has well-defined rules for suitable utilization.

It is crucial to emphasize the importance of dietary patterns (*e.g.,* the Mediterranean diet and the Nordic diet) in reducing the risk of NCDs, even if this type of content may be too complex to be included in a FOPL. It can be preferably disseminated through specific educational campaigns. In this perspective, it might be helpful to transfer to consumers the multi-faceted nature of food and eating information, possibly collecting and sticking them to the food package, aside from FOPLs, using new technologies (QR codes and others). Indeed, the complexity of food composition and the multi-dimensionality of dietary patterns need an indispensable effort to produce an appropriate FOPNL where artificial intelligence (AI) may be a valuable tool for its development.

5. Information on individual foods must be related to global energy and nutrient needs.

As mentioned above, diets comprise several components and mixtures of foods spanning over >100 nutrients and >5000 bioactive molecules. In addition to the perception of healthiness, people are influenced by other factors, such as quality, personal preferences, and price, when buying food products [17,18]. FOPNLs should provide information to promote the proper combination of various foods and to select foods, when relevant, according to specific individual needs (*e.g.*, energy content, sodium, sugar, or saturated fat content).

Attempting to simplify the messages addressed to consumers as much as possible risks becoming ineffective. Reducing the habitual intake to a small number of food items and/or penalizing the intake of some food categories without suggesting adequate food frequencies and portion advice would reduce the variety of food choices, which is the primary requisite for a healthy, sustainable, and pleasant diet. Moreover, FOPNLs should avoid the *halo effect, a* cognitive bias that leads to generalize one's opinion of a given thing based on a single product characteristic (*e.g.*, seeing the green label on a product could lead people to consider it healthy automatically) [4,19].

6. The reference must be as accurate/realistic as possible and, therefore, not based on a fixed quantity of food (100 g, 100 mL, or 100 kcal) but on portions defined by the scientific community for each food.

The information resulting from FOPNLs should be connected to the reality of consumers' eating behaviour. FOPNLs based only on a standard quantity of food (per 100 g, 100 mL, or 100 kcal), which is unnecessary and, arguably, rarely corresponds to the portion eventually consumed, may be misleading. FOPNLs based on a standard quantity of product overlook the role of portion (and frequency of consumption) in determining the nutrient intake without informing on the contribution of a single food to the overall dietary pattern [20]. Some food items that receive a favourable score can be overconsumed; by contrast, other foods may obtain unfavourable scores although they are generally consumed in small or moderate quantities and have well-documented health benefits (*e.g.*, extra virgin olive oil).

These types of FOPL also stimulate food manufacturers to market ultra-processed foods rich in sweeteners, additives, flavourings, thickeners, and others, not towards a desirable reduction in sales units.

A homogenous European portion definition that is scientifically established (by the European Commission and/or by National Institutions) is necessary, and it can have a positive impact on both consumers and stakeholders, avoiding food company interpretations [14]. In any case, for some specific foods, a normalisation to the standard quality (100 g, 100 mL, 100 kcal) may be appropriate to facilitate comparisons.

In our opinion, there is still much work to be done on this aspect of FOPNL development and all stakeholders should contribute.

7. FOPNLs *might also provide helpful information to consumers with specific nutritional needs (e.g., hypercholesterolemia, high glucose levels, hypertension, and celiac disease) or belong to vulnerable categories (e.g., elderly people, infants, children, pregnant and lactating women).*

Although FOPLNs cannot represent a therapeutic tool, people who need to control either energy intake or the intake of a specific nutrient (*e.g.*, a large part of the general adult population) will not be helped by applying a summary FOPNL when choosing foods suitable for their healthy, balanced diet.

A system that does not provide information on why a particular colour/letter has been attributed to a specific food is not thoroughly useful, even misleading for individuals with specific nutritional needs as well as for the vulnerable categories, who also have specific dietary requirements [21]. In any case, strict regulations concerning this issue are envisaged to avoid misuse and commercial biases.

3. Conclusions

FOPNLs aim to inform consumers about adopting healthier eating behaviours, but the current ones fall short of reaching their goals. The most effective strategy for informing consumers should integrate "positive" and, in some cases, "negative" nutrition approaches to promote healthy food choices.

Information provided by FOPNLs must enable users to make easy and informed choices while representing the complexity of overall human nutrition, which appears currently very difficult.

FOPNLs should help consumers make the best choices, including all food categories in their dietary patterns, with adequate quantities, and avoiding overconsumption/underconsumption. Therefore, the choices of individual foods must be framed within a dietary model because no single food can represent either a risk or a benefit for health.

Information on individual foods must be related to global energy and nutrient needs, and the reference must be as accurate/realistic as possible and, therefore, not based on a fixed quantity of food but on portions as defined by the scientific community for each food.

FOPNLs must also provide helpful information to consumers with specific nutritional needs or belonging to vulnerable categories.

The expert group recognises the difficulties and constraints to implementing safe and suitable FOPNLs usage; however, it states that creative and secure labelling should be designed and applied practically.

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Declaration of competing 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.

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