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Nutrition Labelling: We Need a New European Algorithm

Research Article

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Abstract

People often choose and buy foods depending on factors such as personal preferences, price, their age, economic and socio-cultural position. However, Front of Pack Nutrition Labelling can support an informed, aware, and healthier food purchase. It should be easy to read and to understand independently of the consumer's cultural level. There are already validated nutrition labels currently used in Europe as the so called "Positive" labels (Swedish Keyhole Label, the Slovenian Protective Food Symbol and the Finnish Heart Symbol) and the algorithms labels as the British Multiple Traffic Light, the French Nutriscore, and Italy is working on its own system, the Nutrinform. Since each of these food labelling systems has both strengths and weaknesses, devising a new European alogorithm for the general population incorporating the good points and correcting the weaknesses of the labels already being used, has become an urgent public health concern in the light of rising incidences of obesity and all the risks that are associated to it. We are of the opinion that the algorithms that express a global, non binary judgement on a product depending on an overall calculation of the healthy and unhealthy nutrients it contains, could be a good starting point. However, the new European nutrition label, versus those already in use, should express a more comprehensive global appraisal that takes into consideration also some other important nutrition facts, and at the same time should be able to represent all European countries with different food and eating cultures and nutritional problems. Moreover, because the consumer may find portions expressed in grams of product incomprehensible, we underline also the importance to express, when possible, the portions in product units with information on calories per unit.

Keywords

Nutrition; Labelling; Algorithm; Portions

Introduction

Poor eating habits and obesity as well as sedentariness and smoking are the most common life style risk factors for those pathologies (coronary heart disease, stroke and tumors) that taken together cause 44% and 53% of the deaths of European male and, respectively, female adults who die before reaching 65 years old, deaths that can be considered premature and for the most part preventable [1]. In fact, if it is true that a non-healthy risk-associated diet such as a high sodium one is associated to the risk of high blood pressure which is in turn associated to coronary heart disease and cerebral stroke or a diet rich in saturated fats, trans fatty acids and cholesterol is associated to coronary heart disease [2,3], it is also true that a healthy diet can lead to a reduction in risk: for example, eating more fruit and

vegetables is associated to a lower risk of coronary heart disease [4], a high fiber diet is associated to a lower risk of cardiovascular diseases (CVD) and intestinal tumors [5], and large quantities of whole grain cereals and adherence to a Mediterranean diet are associated to a lower risk of CVD and tumors [5,7]. As far as prevention measures are concerned, guiding the population to buy and eat healthy foods can be a useful part of a wider strategy to prevent those diseases [8]. And if people choose and buy foods depending often on factors such as personal preferences, price, their age, economic and socio-cultural position, the Front of Pack Nutrition Labelling (FOPNL) can support a mindful, informed, healthier food purchase [9-12]. The World Health Organisation (WHO) recommends FOPNL as a policy tool to fight the diet related non-communicable diseases and obedity [13].

Front of Pack Nutrition Labelling

Regulation (EU) No. 1169/2011 of the European Parliament and the Council of the European Union of 25 October 2011 laid down rules on the content and presentation of nutrition information on all, with few exceptions, prepacked foods sold in the European Union. These foods must bear a nutrition declaration providing the product's energy value and the amounts of fat, saturates, carbohydrates, sugars, protein and salt contained per 100 grams (if the product is solid) or 100 ml (if it is liquid). The content of the mandatory nutrition declaration can be supplemented voluntarily by additional information that can be expressed per portion or per portion unit of the product. It should be remembered in this regard, that food companies make declarations based on their own cut-off criteria, which may not be scientifically valid, and that information on portions is expressed with reference to grams of product and not to portion units, thus oftentimes adding to the consumer's confusion. While everyone agrees that labels need to be easy to read and to understand independently of the consumer's cultural level, some report has demonstrated that consumers frequently do not understand the nutritional information presented on a FOPNL [14], a tool that can and should be used to slow the tide of CVD incidence particularly within the context of socially and culturally less-advantaged populations [15,16].

Since November 2019 the new European commissioner for health and food safety, the Cypriot Stella Kyriakides, has been examining the question and working on a report that will constitute the basis for a new law on labelling. Many agree that a colored coding, a logo, a graph, and key words in addition to mandatory nutritional information could constitute an immediate, easy-to-understand way to assist consumers in interpreting the nutritional composition of a food product and in distinguishing between products belonging to the same category [17-21].

Labels presently being used in Europe

In Europe several countries already adopte a government-endorsed logos [22,23]. One of the most well known, validated nutrition labels currently being used in Europe is the Swedish Keyhole Label, which was introduced in 1989, recommended by the national government, and utilized in Denmark, Iceland, Lithuania, Northern Macedonian and Norway. Other well known systems include the Slovenian Protective Food Symbol, which was introduced in 1992, the Finnish Heart Symbol, which was introduced in 2000, the British Traffic Light, which was introduced in 2013 and recommended and used in Ireland, and the French Nutri-Score Nutrition

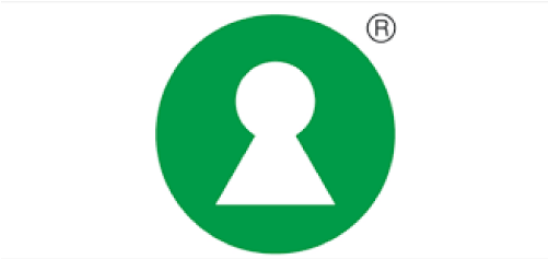

Figure 1: Keyhole Label

Figure 2: Protective Food Symbol

Figure 3: Heart Symbol

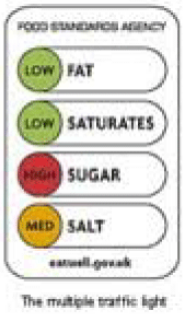

Figure 4: Multiple Traffic Light

Label, which was introduced in 2017 and recommended and used in Belgium, Germany, the Netherlands, Spain and Switzerland, endorsed by the European Consumer Organization (BEUC), and currently used also in Austria, Luxembourg, Portugal and Slovakia [16,22-24].

Three of these labels (the **Keyhole Label**, Figure 1, the **Protective Food Symbol**, Figure 2, and the **Heart Symbol**, Figure 3), also called "Positive" or "Endorsement" FOPNLs, are binary types of appraisals in the sense that they express a global appraisal on the healthiness of a product using a positive/negative threshold [23]. The iconic symbol is applied to products judged on the whole to be healthy in light of their content in total fats, saturated fats, carbohydrates, sugar, fiber and salt. However, other specific components as whole grain cereals and trans fatty acids, are included in the criteria of judgement, respectively, of the Keyhole and of the Heart Symbol [23]. These labelling systems have several strong points, the most

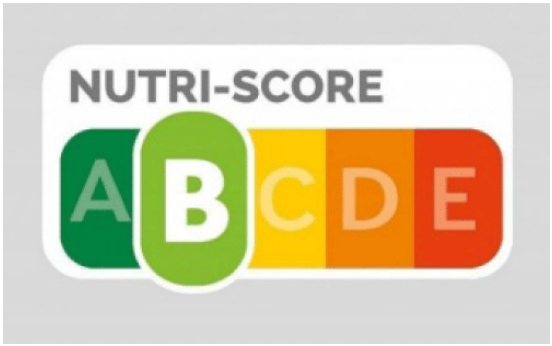

Figure 5: Nutri-Score

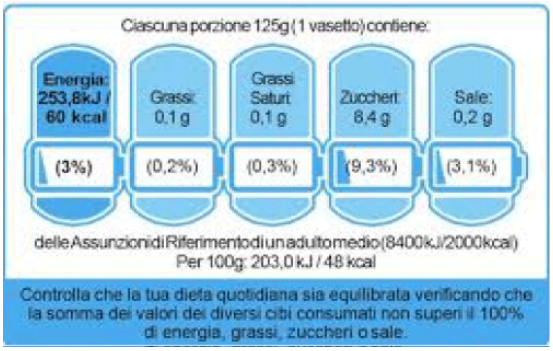

Figure 6: Nutrinform

important being that they are easily understood thanks to their well known, validated symbols (a key, a heart) that are immediately recognized (and often preferred) by consumers who are also able to use them to compare products belonging to the same category [25]. They can, in addition, be applied to dishes on a menu and can be an incentive for food reformulation by food manufacteres. However, they do not provide information on less healthy foods, nor do they contain data on single nutrient, and do not apply to all products such sweets or snacks [23]. Moreover, the public may overestimate the healthiness of products bearing these symbols, and since they focus mainly on fats and salt, they are particularly useful to patients with hypercholesterolemia, high blood pressure, and CVD, but are less helpful to the general population.

The **Multiple Traffic Light** (MTL, Figure 4) labelling system expresses a graduated judgement using traffic light colors (green, amber and red) to alert consumers to low, medium, and high levels of calories, total fat, saturated fat, sugar, and salt in a product [23]. It expresses a judgement, which can be positive, midway, or negative, of the single nutrients contained in the product. It has several plus points: the traffic light system is easily understood, it is

Figure 7: Israeli Red Warning

Figure 8: Chile Warning Label

Figure 9: Health Star Rating

able to help the consumer to make comparisons between foods, and shows in a glance the nutritional value of each nutrient; takes serving size into account when the serving size of the product is more than 100 g or 150 ml; it helps the consumer to be aware of single nutrients; can be an incentive for food reformulation. It can, nevertheless, also cause confusion in those cases a consumer finds more than one judgement (and more than one color) for the same product. Moreover, as for fats, considers only the quantity, but not the quality, and not all fats are egual [6].

The **Nutri-Score** (NS, Figure 5) label converts the nutritional value of the calories, saturated fat, sugar, fiber, protein (not evaluated in other labels), vegetables, fresh fruit, dry fruit and salt present in a food product into a numerical and color code rating [23,24]. Positive and negative points are respectively assigned to healthy and unhealthy nutrients. Final scores, which range between -15 (the healthiest) to +40 (the least healthy), provide a global qualitative judgement on the product that consequently receives a color code ranging from: A/dark green, a highly recommended product, to B/light green - C/yellow, a product somewhere in the middle range, and D/orange - E/red for least healthy products such as sweets or fatty snacks. The NS has many plus points: the label is easy to read and to understand even by culturally and economically disadvantaged individuals (that could have problems with understanding and interpretation FOPNLs) also because it is modelled on the energy efficiency labels applied to appliances that most Europeans already know and use [27,28]; it helps consumers see at a glance how healthy a product really is and, about that, there is some study that founds that NS can improve participants ability to rank food products by their nutritional quality and, moreover, the negative scores D and E (but also the red of MTL) may reduce impulsivity to buy unhealthy foods [26]; facilitating the comparison between food products belonging to the same category, can be an incentive for food reformulation; it expresses a global, non binary judgement on a product depending on an overall calculation of the healthy and unhealthy nutrients it contains (and NS considers more nutrients than other models); if to improve diet quality could reduce the incidence of non degenerative chronic diseases, modelling studies seem that NS could reduce the mortality linked to these diseases by 3.4% (versus -2.8% utilizing the Health Star, -1,6% utilizing the MTL, and -1,1% utilizing the Systeme d'Etiquetage Nutritionnel Simplifié (SENS) [29]. However, it must be underlined that are modelling studies and not analysis on real observational data.

The system, nevertheless, has its own flaws such as: it does not differentiate between refined and whole grain cereals (fiber is not a marker of whole cereals), all types of breads fall under the same category, components as trans fatty acids, cholesterol, added fats, artificial sweeteners, alcohol, are not included in the criteria, and a global judgment such as this one may lead consumers to neglect examining the single nutrients a product contains [23].

Italy has also been working on its own food label system, the **Nutrinform** (NI) (Figure 6) [30] which uses a charging blue/light blue batteries system to present the percentages of energy, fats, saturated fats, sugars and salt contained in a recommended serving of the product, within the context of an optimum daily intake. The "battery-powered" system is based on the premise that the label should encourage consumers to eat a well-balanced,

varied diet, showing to the consumers the nutritional contribution in relation to their daily needs: they have to verify that the sum of the values of the foods consumed falls below 100% of the calories, total fat, saturated fat, sugar and salt recommended for the daily diet of 2,000 kcal, usually recommended for an adult person.

The system, although it doesn't guide to interpret how healthyy/unhealty a product is, could be considered innovative because it does not exclude any food items in the perspective to encourage a well varied diet, and because it underlines the importance of considering the quantity of the food and the percentage of daily intake. However, if the nutrition label intends to simplify the nutritional information presented on a package and to help the consumer to choose the healthiest product, NI doesn't seem to reach the goal: it is not easy to decipher or understand the numbers referring to calories and nutritional needs printed in tiny print; nor does the light blue coloring assist the consumer to understand at a glance the label's message (a green/red color scheme helps the consumer to make a rapid comparison of similar products). In addition, it can be considered confusing as it gives information per portion express in grams and not to a reference amount such as to 100g/100ml and thus does not facilitate a comparison of products within the same category. Finally, the consumer should not reach the 100% mark because doing so would mean essentially that too many calories, total fat, saturated fat, sugar or salt of the day's total ration are being filled: but, as pointed out by the Coldiretti, an Italian association of farmers, the system seems counter-intuitive as nearly everyone is accustumed to thinking of the full battery symbol on a cell phone as a positive thing.

To complete the picture of nutrition labelling systems currently being used, it is important to remember that outside of Europe there are other nutritional symbols [23,29]. Some, as the Israeli Red Warning Label (Figure 7) and the Chile Warning Label (also utilized in Perù and Venezuela) (Figure 8), are based on warning labels appearing on foods and beverages containing high levels of fat/saturated fat, sugar, sodium, calories. Instead, the Health Star Rating system (Figure 9), which is used in Australia and New Zealand, rates the overall nutritional profile of packaged foods by assigning scores (in the form of stars) that range from a half star (the least helthy) to 5 stars (the healthiest). It is similar to the NS although it is less complete as it is based exclusively on calories, total fat, saturated fat, sugar and salt. However, it provides a quick, easy, standard way to compare similar packaged foods.

The need for a new European algorithm

FOPNLs used until now in Europe have several similarities. However, since each system has both strengths and weaknesses, and it is difficult assess which system is most effective, devising a new, easy to use European alogorithm for the general population (and not just for single patient categories), incorporating the good points and correcting the weaknesses of the labels already being used, has become an urgent public health concern in the light of rising incidences of obesity and all the risks that are associated to it [31]. An international, indipendent working committee composed of experts in nutrition, cardiovascular and cancer prevention, and public health could be charged to develope a new algorithm. We strongly believe the algorithms that express a global, non binary judgement on a product depending on an overall calculation of the healthy and unhealthy nutrients it contains, could be a good starting point. However, the new European nutrition label, versus those already in use, should express a more comprehensive global appraisal that takes into consideration also some other important nutrition facts, such as, for example, the specific animal's origins of saturated fats (e .g. meat foods versus dairy, the latter being considered less harmful) [32], the presence of cholesterol, the presence of partially hydrogenated fats (as evaluated in "Heart Symbol" label), which are well known health hazards [33], the presence of added fat, the difference between refined and wholegrain cereals (as evaluated in "Keyhole" label) [5], the gycemic index, the difference between natural and added sugars [34], calcium, vitamins and polyphenols (which have antioxidant protective properties) [6].

Additionally, but not mandatory, information regarding the product's environmental impact, meaning its energy consumption, greenhouse gas emissions, and biodiversity could be provided. Last but not least, the new European algorithm must be in line with the international guidelines, but at the same time also with the national guidelines and able to represent all European countries with different food and eating cultures and nutritional problems, so that even the typical products of one nation can fall under the new system. And there are evidences that for certain product groups the algorythms already in use are not always aligned with national dietary guidelines [35]. This could be a difficult step, that could be passed allowing the possibility to

adapt/implement the new European algorithm by national recalibrations. This is the road followed, for example, by the European Society of Cardiology when decided to adopt two cardiovascular disease risk assessment systems (SCORE, Systematic COronary Risk Evaluation), one for the European Countries at high cardiovascular risk and one for the European Countries at low cardiovascular risk [36].

The considerations of other organizations such as consumer groups, farmer and producer associations (checking that they are not too much linked to commercial interests) could also be sought. Therefore, the scientific-institutional alliance would create a labelling system that is not only scientifically correct and complete, but also well regulated, transparent and credible. And trust in the logo is the precondition for success.

Reformulation and portions in units

There are international evidences, regarding the validated nutrition labels currently used, that suggest that FOPNL can encourage reformulation [37]. Also the new European label should be an incentive for food manufacteres to improve the nutrition quality of their products through reformulation and innovations. As public health strategy aiming to prevent obesity, producers and retailers should be persuaded and encouraged by scientific experts and governmental agencies to reformulate or to create new products that are more healthy in nutritional terms and to change food product portion sizes in the attempt to drive consumers to eat more appropriate (healthier) servings [20,37]. About that, the consumer may find portions expressed in grams of product incomprehensible, if not confusing, and useless for making comparisons with similar products. Therefore, when possible, portion could be easily expressed in units (for example, one glass of milk, one yogurt, one table spoon of breakfast cereals, one cracker, one slice of ham, one hamburger, ten pistachio nuts, one table spoon of extra-virgin olive oil, one cookie, one scoop of ice cream) with information on calories per unit which would be very useful to overweight subjects, but also to underweight subjects.

Definitely, in an alliance perspective of public health, food marketers should be encouraged to promote healthy foods over unhealthy ones. The hope is that the marketing strategies, can also take into account, if not above all, the health of consumers: combine profit and health is a real possibility!

Discussion

There are already validated nutrition labels currently used in Europe. However, since each of these food labelling systems has both strengths and weaknesses, devising a new, easy to use European alogorithm for the general population incorporating the good points and correcting the weaknesses of the labels already being used, has become an urgent public health concern in the light of rising incidences of obesity and all the risks that are associated to it. Therefore, an European indipendent working committee composed of experts in nutrition, cardiovascular and cancer prevention, and public health could be charged to develope a new algorithm in line with the international guidelines. We also believe that the algorithms that express a global, non binary judgement on a product depending on an overall calculation of the healthy and unhealthy nutrients it contains, could be a good starting point. However, the new European nutrition label should express a more comprehensive global appraisal that takes into consideration also some other important nutrition facts (as sometime the “Positive”, bynary labels do), and at the same time should be able to represent all European countries with different food and esting cultures and nutritional problems, so that even the typical products of every nation can fall under the new system. Therefore, every nation should have the possibility to adapt/implement the new European algorithm by national recalibrations.

This effort to create a single, shared, scientifically valid, and easy to read and understand (also by people in the lower socio-economic-cultural level) new European nutrition label, could be also an incentive for food manufacteres to improve the nutrition quality of their products through reformulation and innovations and to express the portions in comparable units. All these actions, accompanied by an educational campaign (indispensable to aid the consumer in understanding and judging nutritional information) could be, in a comprehensive nutrition policy package, a crucial measure to promote healthier food choices, fight obesity and concur to improve the cardiovascular and cancer prevention in Europe.

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