Monitoring the first implementation year of the new nutrition labeling regulations in Brazil

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ABSTRACT

Objective: This study aimed to monitor the initial 12 months of the implementation of the updated nutrition labeling regulations in Brazil approved in 2020, focusing on the presence and readability of the front-of-package nutrition labeling (FOPNL) on food packages and the presence of added sugars information in the nutrition facts panel.

Methods: We used data on nutrition information and FOPNL of 6,829 food and beverages packages launched at Brazilian food retail between November 2022 and October 2023, available at the Mintel - Global New Products Database. We applied eligibility criteria regarding food groups and cut-off limits for three critical nutrients stipulated by regulations to identify products eligible for FOPNL. We classified the food and beverage according to the NOVA classification, identified the products with added sugars information in the nutrition facts panel and those with FOPNL for added sugar, saturated fat or sodium. Moreover, we analyzed the temporal trends in FOPNL presence among eligible products during the study period. Last, a subsample of 202 product labels was analyzed to identify non-compliance with FOPNL readability standards.

Results: 63.9% of the products analyzed were eligible for at least one critical nutrient's FOPNL; however, only 12.9% already featured FOPNL by the end of the 12-month implementation period. Among ultra-processed products, 65.1% were supposed to have FOPNL, but only 14.4% did. Less than 30% of sweet cookies, ice cream, tabletop sweeteners, and candies with added sugar in the list of ingredients declared this information in the nutritional facts panel. Analysis of label images revealed non-compliance with FOPNL readability regarding its location on the packaging, FOPNL in removable parts of the packaging or hidden positions, and inadequate color pattern and format.

Conclusion: The implementation of the nutrition labeling regulations in Brazil within the first 12 months reached less than 15% of eligible foods and beverages, indicating non-compliance by the food industry. In this period, almost all new launched products available in the market should have been compliant with the new regulations. Such inadequacies undermine the expected impact of promoting healthier choices at the point of food purchase.

Keywords: Food labeling, Front-of-package nutrition labeling, Food retail, Monitoring.

INTRODUCTION

When mandatory, front-of-package nutrition labeling (FOPNL) is a practical and effective tool to inform the population about health risks of food products. It also supports purchasing decisions and contributes to preventing non-communicable chronic diseases (NCDs) related to the consumption of ultra-processed products (1-3).

In 2020, new rules for nutrition labeling of packaged foods and beverages were approved by the Brazilian National Health Surveillance Agency (Anvisa) through Resolution of the Collegiate Board (RDC) No. 429/2020 and Normative Instruction (IN) No. 75/2020, which came into effect on October 9, 2022. The new rules improved the readability of the nutrition facts panel, including the mandatory declaration on total and added sugars and the information on the nutrients content by 100g/ml. It also includes mandatory FOPNL on eligible foods and beverages high in saturated fats, added sugars and sodium. The Brazilian FOPNL model is a magnifying glass inside a black and white rectangle with the words “high in”. In order to facilitate consumers visibility, it must be placed on the superior half of the front panel of the package. It can vary in design and size depending on the dimensions of the package (4,5).

Latin American countries implementing regulatory measures adopting a warning FOPNL have noted positive changes in population purchase behavior. In 2016, Chile was the first country in the world to adopt a warning FOPNL in the format of an octagon included in foods high in calories, sugar, sodium and saturated fats. A study evaluating changes in food purchases of the Chilean population after the first phase of the law implementation showed that overall calories purchased declined by 16.4 kcal/per capita/day, sugar declined by 11.5 kcal/per capita/day, saturated fat declined by 2,2 kcal/capita/day, and sodium declined by 27.7 mg/capita/day, when compared with the period before the law (6).

Another study from Chile evaluated changes in purchases of non-nutritive sweeteners (NNS) and caloric-sweetened (CS) beverages after the first year of warning FOPNL implementation. Results showed that Chilean families reduced CS-only beverage purchases by 5.9% and increased purchases of beverages with any NNS (sucralose, aspartame, acesulfame K, and steviol glycosides) by 26.5% (7).

Besides contributing to the reduction of purchasing and consequently the consumption of foods and beverages with high amounts of sugar, fats and sodium, the FOPNL models in general have been seen as a strategy to encourage the food industry to reformulate products, replacing or reducing critical nutrients and ingredients that are risk factors for NCDs (8,9,10).

In Peru, a country that also implemented the warning FOPNL in octagon format, a study was developed using data from the nutrition composition of food labels collected in three different moments of the warning FOPNL implementation: three months before, four months after, and two years after. It showed that, between the first and third data collection, there was a reduction of 9.0 to 5.9 g/100 mL in the median sugar content of beverages, combined with an increase in the use of NNS. This change reduced from 59.0% to 31.0% of beverages carrying a warning FOPNL. Among foods, reductions were observed in saturated fat (from 6.7 to 5.9% g/100 g). The proportion of products with a warning FOPNL declined from 82.0% before the implementation to 62.0% after (11).

These Latin American studies emphasize the necessity of ongoing monitoring of the implementation of food labeling policies. The monitoring processes based on data collection in supermarkets have been documented in technical reports by the Chilean Ministry of Health. These reports provide information and standardized procedures to monitor nutrition food labeling laws since 2017, supporting improvement and inspection of the country's law (12).
Considering the lack of public data and systems to monitor food labels in Brazil, an alternative to monitoring such regulations is to access data from private companies in the food retail sector. One option is through a database subscription that is frequently updated and contains the

nutrition composition and all label information of packaged food and beverages commercialized in the country, such as Mintel – Global New Products Database (Mintel-GNPD) (13). Therefore, this study aimed to monitor the initial 12 months of the implementation of the updated nutrition labeling regulations in Brazil approved in 2020, focusing on the presence and readability of the front-of-package nutrition labeling (FOPNL) on food packages and the presence of added sugars information in the nutrition facts panel.

METHODS

Sample and presentation of the data source for monitoring

Data from nutrition composition, labeling description, and images from food and beverage labels were obtained from Mintel - Global New Products Database (Mintel-GNPD) (13). Although it is a commercial database with restricted access to subscribers, information available on Mintel-GNPD follows attributes recommended by the Pan-American Health Organization (PAHO) (14) to analyze public health data. As of frequency (Mintel has collected data from food labels regularly since 1996 in the country) and timeliness, considering the current availability of labeling data from packaged food and beverages during the implementation of the updated nutrition labeling regulations in Brazil. Access to Mintel-GNPD data is provided through subscription and by creating an institutional account with login credentials.

All food and beverage labels available between November 9, 2022, and November 9, 2023, were identified and extracted from Mintel-GNPD, totaling 9,491 products. The products were collected from food retailers in cities and capitals of 10 Brazilian states: Rio de Janeiro, São Paulo, Paraná, Bahia, Pernambuco, Minas Gerais, Santa Catarina, Goiás, Rio Grande do Sul, Amazonas e o Distrito Federal (DF). This approach guarantees representativeness and diversity of products and brands of companies of different sizes. A small portion of the food items were collected on websites. Despite the new rules implemented on November 9, 2022, the decision was to analyze products included in the database a month later to ensure compliance with the validity period of the regulation, which aligns with the average time of data updating in Mintel-GNPD (13).

By accessing data from Mintel-GNPD, it was also possible to analyze a sub-sample of the label images showing all sides of the packaging to identify any inconsistencies in the format of the RNF regarding positioning, size, and color specifications as outlined in IN No. 75/2020.

We downloaded the images directly from the Mintel-GNPD website in Microsoft Office program Word files, containing images of all sides of the packaging, product descriptions, identification numbers, and barcodes.

Key aspects of RDC No.429/2020 and IN No.75/2020 monitored

The FOPNL is mandatory in all food packages, except for the following food categories (if not added with sugar or significant nutritional value from saturated fat or sodium): fruits; vegetables; legumes; roots; cereals; nuts, seeds, and mushrooms; flours; packaged, refrigerated or frozen meat and fish; eggs; fermented milk; cheeses; milk from all species of mammals animals; powdered milk; olive oil and other vegetable oils, cold-pressed or refined; salt; infant formulas; enteral nutrition formulas; weight control foods; food supplements; alcoholic beverages; products intended exclusively for industrial processing; products intended exclusively for food services; food additives and processing aids. Besides food groups criteria, to verify the eligibility of products that need to carry FOPNL cut-off points stipulated in IN No. 75/2020 were considered, i.e., added sugar (solid foods: ≥ 15 g/100 g of food; liquids: ≥ 7,5 g/100 g of food), saturated fat (solid foods: ≥ 6 g/100 g of food; liquids: ≥ 3 g/100 g of food), and sodium (solid foods: ≥ 600 mg/100 g of food; liquids: ≥ 300 mg/100 g of food). All food and beverages available in Mintel-GNPD eligibility criteria for food groups and cut-off points were applied to the three critical nutrients established in RDC No. 429/2020 and IN No. 75/2020. Foods that did not meet the eligibility criteria regarding food groups were excluded from the analysis, totaling 3,112 (32.78%). Finally, we analyzed 6,829 food and beverages.

Regarding the nutrition facts panel, we further verified the incorporation of total and added sugars declaration with the quantities per portion, 100 g or 100 mL, and their respective percentage of caloric value recommended per day.

Further evaluation considered the regulation compliance related to its application and legibility of FOPNL, RDC No. 429/2020 requirements (4). FOPNL declaration must: I - be printed in 100% black on a white background; II - be located on the superior half of the front panel in a unique continuous surface; III - have the same text orientation as the other label information; IV - follow one of the designs defined in Appendix XVII of IN No. 75/2020; V - meet specific requirements of IN No. 75/2020 (5), and the FOPNL may not be covered positions or be in removable parts of the package, such as the seal, or located where is difficult to see, such as sealing or twisted areas of the package.

Study variables

For nutrition composition analysis with macro and micronutrient information, we processed the data available in Mintel-GNPD, which involved standardization, cleaning (outliers' removal to energy by 100 g or mL), and adequacy of variables of interest (dichotomic variables or stratification). Additionally, it was possible to verify that nutrition composition data of food and beverages available in Mintel-GNPD presented high consistency to calories, carbohydrates, total sugar, protein, total fat, saturated and trans-fat, sodium, and fiber in most of the products analyzed. In comparison to data from packages collected by trained researchers in supermarkets, this data collected according to the Intraclass Correlation Coefficient (ICC) presented good (ICC:0.6-0.8) to an excellent agreement (ICC>0.8). Significant differences in mean values ($p \geq 0.05$) of these nutrients were not found by 100 g or mL of product when compared with data collected by trained researchers (15).

Dichotomous variables (0=no; 1=yes) were created to classify food that exceeded the established limits for added sugar, saturated fat, and sodium. A variable was created for "high in at least one of the three critical nutrients" when foods exceeded established limits by the regulation.

From a variable named "product description", foods that carried FOPNL were identified through the following searching terms: *"high in added sugar"*, *"high in saturated fat"*, and *"high in sodium"*. We conducted this search in English since the database provided information in this language. Using content analysis with commands to "string" function from Stata 16.0 statistical package, these terms were identified and converted to dichotomous variables (0=no, 1=yes), named: "received FOPNL for added sugar", "received FOPNL for saturated fat", and "received FOPNL for sodium". A fourth dichotomous variable was named "received at least one FOPNL "when food had at least one and a maximum of three critical nutrients declared on FOPNL.

To aid the monitoring analysis, food and beverages available were aggregated by categories and subcategories of most purchased by Brazilians, as shown by the Household Budget Surveys from 2017/18 (16), and by Nova classification of foods based on the extension and purpose of food processing (17), which classifies food and beverages in four categories: 1. unprocessed or minimally processed foods, 2. processed culinary ingredients, 3. processed

foods, and 4. ultra-processed. However, we did not include the unprocessed or minimally processed foods category (e.g., fruits, vegetables, meats, milk, eggs, cereals, beans, and legumes) as they are foods without the addition of sugar, sodium, and fat, so not eligible to receive FOPNL.

Data analysis

We performed descriptive analyses of proportion and confidence interval of 95% (CI95%) of food and beverages carrying FOPNL for added sugar, saturated fat, and sodium, as well as the ones eligible considering as parameters the cut-off points of critical nutrients from the nutrient profile model adopted in the RDC No. 429/2020 and other eligibility criteria by food groups explained above.

Analyses were carried out by categories and subcategories of food groups and by launching classified by Mintel-GNPD when collecting data (new package, new formula, new product range, new product, and re-launch). The proportion of food and beverages qualified and receiving the FOPNL was calculated for each month of the monitoring period to verify if there was an increase or decrease in regulation compliance regarding the mandatory presence of the declaration on the front face of the package.

The proportion of foods considered “high in added sugar” relative to the cut-off points indicated in IN No. 429/2020 was calculated. From this, we verified the proportion of products that declared added sugar on the nutrition facts panel, positioned on the back or side of the package. A chart presents the main inadequacies identified regarding the FOPNL legibility (Chart 1). All analyses were carried out in Stata 16.0.

RESULTS

During the 12 months, we analyzed 6,829 food and beverages launched in the Brazilian food retail. The data collection mainly covered supermarkets (68.0%), specialized stores (8.0%), healthy food stores (5.0%), gourmet stores (4.0%), wholesale markets (3.0%), department stores (3.0%), online stores (2.0%), and other food retail stores, such as resellers, drugstores, convenience stores, and distributors (7.0%). Organizing by the type of launching, 38.0% referred to a new package, 26.0% were new variety or product range extension, 23.0% were new products, 12.0% were relaunching, and 1.0% were new formulation. According to

the NOVA classification, 2.5% of the sample were processed culinary ingredients, 15.6% were processed foods, and 66.7% were ultra-processed products.

Around 64% of the food and beverages analyzed were eligible for the FOPNL. Among the processed culinary ingredients, 45.3% were eligible, including 100.0% of animal fat products that should receive a FOPNL for saturated fat and 65.4% for sodium. Between processed foods, 62% were eligible for the FOPNL for at least one nutrient, including 42,9% of them that were eligible for the high in sodium FOPNL. For ultra-processed products, 65.1% should have FOPNL for at least one nutrient. This proportion was even higher for some subgroups: e.g., between 90.0 and 100.0% of sweet biscuits, margarine, cakes and pies, and chocolates were eligible to receive a FOPNL for at least one nutrient. A total of 94.6% of sausages and other reconstituted meat products and 81.7% of ready-to-eat meals should receive FOPNL for sodium (Table 1).

In this first year of implementation, only 12.9% of the eligible food and beverages were complying to the regulation). Only 5.4% of processed culinary ingredients, 7.9% of processed foods, and 14.4% of ultra-processed products received a FOPNL for at least one of the three critical nutrients. From the analyses, more than 60.0% of ultra-processed should have FOPNL. Among this subgroup, chocolates and margarine are the products that had more FOPNL for added sugar, saturated fat and sodium, with around 40.0% of the products complying to the regulation (Table 2).

Regarding the declaration of added sugars in the nutrition facts panel, only 20.3% of the processed foods high in this nutrient have declared the information, while for ultra-processed products, only half of the products high in added sugar had declared it. In some subcategories of ultra-processed products, such as sweet biscuits, ice creams, tabletop sweeteners, candies, sausages, and other reconstituted meat products, the proportion of added sugar declaration on the nutrition facts panel was below 30.0%, and all of them had added sugar in the ingredient list (Table 3).

Analyzing the presence of FOPNL by type of launch in the retail sector, it was possible to verify that from the total of foods with FOPNL, 16.9% were classified as new package, 16.0% were new formula, 14.1% were re-launch, 10.1% new package, and 8.5% new range of products. Between ultra-processed products, we verified a higher proportion of FOPNL presence between products classified as a new package and new formula (Table 4).

Figure 1 shows the monthly evolution of foods that received FOPNL for at least one critical nutrient in the first 12 months of RDC No 429/2020 implementation and the proportion of foods eligible to receive FOPNL launched in the Brazilian market. At the beginning of the

monitoring, the proportion of foods that had received FOPNL was around 10%, and in the end, this proportion increased to 30%. On one hand, we verified that the proportion of eligible foods decreased gradually over the months. On the other hand, the proportion was sustained at 60.0% and 70.0%, almost the same amount as at the beginning of the monitoring, which may indicate the non-compliance of FOPNL incorporation by the food industries of the country.

Also, it was observed inadequacies in FOPNL legibility in a sub-sample of 202 label images launched in the first six months of monitoring. From this total, 61.1% were chocolates, 17.8% were baked goods, 6.7% were snacks, 4.3% were sweet fillings for bread, 4.3% were sauces and seasoning, 2.4% were dairy products. Around 41% of the products had the magnifying glass positioned on the side of the package and not in the frontal face aligned with the other information. In 12.0% of the products, the FOPNL was in removable or hidden parts of the package, 1.0% in the back of the package, and 0.05%, the color pattern and format of the FOPNL were different from recommended.

DISCUSSION

This study aimed to monitor the implementation of RDC No. 429/2020 in Brazil, which aims to improve information on packaged food and beverage labels by incorporating the mandatory declaration of the FOPNL for products that exceed the limits for added sugar, saturated fat and sodium, among other aspects. The data analyzed represented almost all of the foods and beverages launched in Brazilian retail outlets in the first year of implementation of the new regulation, according to the Mintel-GNPD databases.

Our study briefly showed that, of all the foods analyzed, around 63.9% were eligible to receive the FOPNL for at least one nutrient. Yet, only 12.9% (or 5 times less) already had this information on the label. The situation is even worse among ultra-processed products, where 65.1% should receive the FOPNL, and just 14.4% were complying with the regulation. In addition, products such as sweet biscuits, ice cream, tabletop sweeteners, candies in general, sausages, and other reconstituted meat products high in sugar had a low proportion of added sugar information in the nutrition facts panel (<30.0%). After analyzing the label images of a sample of products in the first six months, inadequacies were observed in the standardization and legibility of the FOPNL on food packages.

In Brazil, this is the second study focused on monitoring the implementation of the FOPNL using data from packaged food and beverage labels available in Brazilian retailers.

The first study collected primary data from packaging directly in supermarkets from May to October 2023, adding up to 2,145 products found in five Brazilian states and focusing on characterizing the products with the presence of FOPNL (18). Herein, on the other hand, we used a commercial database with a sample of 6,829 products launched in the retail sector in 10 Brazilian states and the Federal District over 12 months, with the additional aim of verifying eligibility and inadequacies in the FOPNL readability. However, similarities among the studies can be observed where both showed that, among the products with a FOPNL, the majority were high in added sugar and/or saturated fat and most part of them classified as ultra processed foods.

In Latin America, countries that have a mandatory implementation of warning FOPNL, such as Chile and Uruguay (octagon format), have presented monitoring analyses and technical reports from governments following the compliance process by food industries and consumers' understanding of the presence of labeling on food in the first months of implementation. For example, a study in Uruguay with consumers in the first month of the law's implementation showed a high level of awareness and self-reported use of the FOPNL.

In addition, a comparison between before and after the implementation showed that the FOPNL increased consumers' ability to use nutrition information to compare products and identify products with excessive sugar, fat, saturated fat and sodium content (19). In Chile, the governmental technical report of 2017, one year after the law implementation, which included mandatory warning FOPNL and restriction of child-directed marketing, showed that 71% of food retailers were complying with the law (12).

Our monitoring study showed that in the first 12 months of implementing the updated nutrition labeling regulation in the country, only 13% of the eligible new products in Brazil had the FOPNL for at least one nutrient, a much lower percentage than that found in Chile at the beginning of the FOPNL implementation process.

In Brazil, adopting a new labeling regulation with the incorporation of the FOPNL took a long time and was strongly influenced by the food industry at various stages of the regulatory process. This influence has yielded more delays (20), including the recent publication of RDC No. 819/2023, which determined that the food industry could use old packaging in storage without incorporating the FOPNL for longer than determined by RDC No. 429/2020.

The industry's interference to delay the regulatory process is also reflected in the large number of foods we identified as eligible that did not present the FOPNL for critical nutrients. This noncompliance emphasizes resistance from these companies to follow the country's labeling regulations.

It is widely known that ultra-processed products most often exceed the amounts of sugar, fat and sodium (17) and that a FOPNL that identifies these critical nutrients in excess could help consumers identify this food category. Ultra-processed products have been associated with a higher risk of obesity, cancer, and cardiovascular diseases, among other diseases (21-25). In addition, the consumption of these foods is associated with poorer diet quality (26-28) and environmental impact (29). Therefore, as soon as all ultra-processed products in Brazil that exceed the thresholds for critical nutrients set out in RDC 429/2020 are complying with the regulations, the sooner consumers will improve their food choices and, consequently, reduce the prevalence of obesity and other NCDs in the country.

Our study shows that 64.4% of ultra-processed products were high in added sugar. Out of them, only 10.7% had the FOPNL, and 33.5% declared the added sugar in the nutrition facts panel. This result indicates that the difficulties for consumers to identify all types of added sugars still remain, as it is still predominantly presented only in the list of ingredients (30).

Sweetened beverages, in particular, have been associated with diabetes, obesity, and cardiovascular disease (31-33). They have been the subject of public policy discussions on taxation and warning FOPNL to reduce consumption by the population (34). In Chile, the volume of beverage purchases that were high in added sugar decreased by 22.8 mL/per capita/day when compared to the scenario before the law implementation (35). Our study found that only 3.5% of carbonated soft drinks had the FOPNL for high added sugar, yet almost 70% of these products were eligible to comply with the regulation.

The World Health Organization (WHO), the United Nations Children's Fund (UNICEF), and the World Heart Federation (WHF) recognize the role that food labeling policies, including FOPNL, play in promoting healthier choices and preventing NCDs related with the consumption of unhealthy foods (36-38). When mandatory, FOPNL leads the reformulation of food industry products (8,11,39,40), aiming to reduce or replace critical nutrients, such as replacing sugar with sweeteners (11). However, these replacements are not considered the best alternatives, as the products remain being ultra-processed and there other health risks related to the ingredients substitution.

According to a recent technical report published by the WHO, there are potential undesirable effects resulting from the prolonged use of sweeteners, such as an increased risk of type 2 diabetes, cardiovascular disease, and mortality in adults (41). In this context, constant monitoring of the nutrition composition of foods and beverages to identify reformulation processes is crucial to guarantee the nutritional quality of reformulated foods and to verify the possible health impacts that these reformulations could bring to the population.

In Brazil, there is no data showing changes in the nutrition profile of products from reformulation or changes in the food purchases due to the implementation of the updated nutrition food labeling legislation yet. From a public health perspective, monitoring nutrition composition and food labeling of packaged food and beverages provides information about the healthiness of the consumers food environment. It also supports the planning, implementation, and improvement of interventions in public health (42).

There are different ways to obtain data to monitor this information, such laboratory analyses of available foods in the market (which are costly and tricky to develop on a large scale), data collection in food stores (which requires team recruitment and training and a long process of data treatment and typing to create a database), web-scraping of available data in online sources, and data from label images shared by consumers using smartphones applications (e.g. *Desrotulando* App) (42). However, few strategies can capture the dynamic changes in the food market (43).

One of the strengths of our study was the use of validated commercial data (15), which provided a monthly updated database with a large sample of foods and beverages launched in Brazilian food retail. These data made it possible to carry out the monitoring analysis quickly and with country level representation. Another methodological highlight was the identification of eligible products for the FOPNL, indicating in the first year of implementation, the products that were non-compliant with the standards of IN No. 75/2020. Our research is the first scientific study to make these observations.

Among the limitations about the food and beverage sample used is the fact that these are products characterized by some type of launch (i.e. new packaging, variety and/or line extension, new products, relaunches and new formulas) and in this case, products available in food retail that did not fit these characteristics were not collected by Mintel-GNPD. Therefore, only an audit process at supermarkets would provide better estimates of the presence of FOPNL in the food available in food retails, making it possible to analyze those products that were already consolidated in the market and were not launches.

In conclusion, the implementation of RDC No. 429/2020 was slow and gradual in the initial 12 months, highlighting the hardships faced by food industries to meet the regulatory deadlines. Besides, inadequacies regarding FOPNL legibility may compromise consumers' healthier choices when purchasing food.

Table 1. The proportion (95% CI) of foods and beverages launched in Brazilian retail and considered eligible to receive FOPNL for added sugar, saturated fat, and sodium or at least one critical nutrient during the first year of implementation of RDC Nº 429/2020.

Food Categories	**Proportion (95% CI) of eligible products for FOPNL**				
	N (%)*	**Added Sugar**	**Saturated Fat**	**Sodium**	**At least one critical nutrient**
Processed culinary ingredients	203 (2.52)	0.98 (0.24; 3.85)	27.09 (21.42; 33.61)	18.22 (13.50; 24.15)	45.32 (38.60; 52.21)
Animal fat	52 (0.65)	0	100.00	65.38 (51.61; 76.98)	100.00
Starches	42 (0.52)	0	0	0	0
Other processed culinary ingredients	109 (1.35)	1.83 (0.45;7.03)	2.75 (0.10; 8.18)	2.75 (1.00; 8.18)	36.69 (28.19; 46.11)
Processed foods	1,257 (15.61)	38.02 (35.38; 40.74)	36.67 (34.05; 39.37)	42.88 (40.16; 45.63)	61.97 (59.25; 64.61)
Bread	102 (1.27)	48.00 (38.53; 57.68)	51.96 (42.31; 61.46)	40.20 (31.14; 49.96)	50.98 (41.36; 60.53)
Cheese	4 (0.05)	0	75.00 (23.78; 96.64)	0	25.00 (3.35; 76.22)
Processed meats	118 (1.47)	12.71 (7.81; 20.00)	28.81 (21.36; 37.61)	77.97 (69.59; 84.54)	45.76 (37.00; 54.79)
Other processed meats	1,033 (12.83)	40.00 (37.12; 43.09)	35.91 (33.04; 38.89)	39.30 (36.36; 42.32)	65.05 (62.09; 67.90)
Ultra-processed products	5,369 (66.68)	64.40 (63.11; 65.68)	56.79 (55.46; 58.11)	51.31 (49.97; 52.64)	65.06 (63.78; 66.32)
Sausages and other reconstituted meat products	299 (3.71)	76.25 (71.11; 80.73)	21.07 (16.81; 26.06)	94.64 (91.44; 96.69)	76.92 (71.80; 81.35)
Sweet biscuits	442 (5.49)	92.53 (89.68; 94.64)	93.89 (91.23; 95.77)	79.63 (75.62; 83.14)	94.11 (91.50; 95.96)
Savory biscuits	490 (6.09)	59.39 (54.97; 63.65)	71.02 (66.84; 74.87)	70.00 (65.79; 73.89)	73.26 (69.17; 76.99)
Margarine	19 (0.24)	10.53 (2.64; 33.74)	100.00	94.74 (70.60; 99.26)	100.00
Cakes and pies	335 (4.16)	91.64 (88.15; 94.17)	84.17 (79.86; 87.71)	42.98 (37.78; 48.35)	97.61 (95.29; 98.80)
Sliced bread	311 (3.86)	67.20 (61.78; 72.19)	78.13 (73.20; 82.38)	41.47 (36.12; 47.04)	44.05 (38.62; 49.62)
Candies in general	633 (7.86)	72.19 (68.57; 75.54)	37.75 (34.06; 41.60)	30.96 (27.48; 34.67)	79.30 (75.97; 82.28)
Carbonated sweetened beverages	172 (2.14)	69.76 (62.49; 76.16)	0	73.25 (66.14; 79.33)	27.32 (20.18; 34.46)
Chocolate	398 (4.94)	95.72 (93.23; 97.34	97.73 (95.71; 98.81)	12.31 (9.43; 15.91)	99.25 (97.68; 99.75)
Noodles	108 (1.34)	10.18 (5.72; 17.46)	35.18 (26.77; 44.62)	29.63 (21.79; 38.89)	18.51 (12.26; 26.97)
Ready-to-eat meals	333 (4.14)	48.64 (43.31; 54.01)	79.27 (74.58; 83.29)	81.68 (77.15; 85.47)	49.24 (43.90; 54.60)
Non-carbonated sweetened beverages	539 (6.69)	41.37 (37.28; 45.58)	15.21 (12.42; 18.50)	31.35 (27.57; 35.39)	28.57 (24.91; 32.53)
Dairy beverages	262 (3.25)	32.82 (27.40; 38.74)	23.66 (18.90; 29.18)	39.69 (33.94; 45.74)	7.63 (4.97; 11.53)
Ice cream	214 (2.66)	73.83 (67.53; 79.28)	77.57 (71.49; 82.66)	41.59 (35.17; 48.30)	49.53 (42.88; 56.20)

Sauces and condiments	458 (5.69)	49.34 (44.78; 53.91)	44.76 (40.26; 49.34)	64.19 (59.69; 68.45)	72.49 (68.22; 76.38)
Tabletop sweetener	17 (0.21)	35.29 (16.78; 59.59)	0	35.29 (16.78; 59.60)	29.41 (12.80; 54.19)
Others UPPs	339 (4.21)	53.68 (48.35; 58.93)	69.03 (63.90; 73.72)	43.95 (38.75; 49.28)	76.69 (71.89; 80.89)
TOTAL	**6,829 (100.00)**	**57.66 (56.49; 58.83)**	**52.20 (51.02; 53.38)**	**48.77 (47.59; 49.96)**	**63.90 (62.75; 65.03)**

CI 95%: 95% Confidence Interval; FOPNL: Front-of-package Nutrition Labeling; *total number of foods that were considered eligible to apply the cut-off points for the critical nutrients studied.

Table 2. The proportion (95% CI) of foods and beverages launched in Brazilian food retail with FOPNL for added sugar, saturated fat, and sodium or at least one critical nutrient during the first year of implementation of RDC Nº 429/2020.

Food Categories		**Proportion (95% CI) with FOPNL**			
	N (%)*	**Added Sugar**	**Saturated Fat**	**Sodium**	**At least one critical nutrient**
Processed culinary ingredients	11 (1.25)	0.05 (0.01; 3.41)	4.92 (2.67; 8.91)	0	5.41 (3.02; 9.51)
Animal fat	10 (1.13)	0	19.23 (10.67; 32.18)	0	19.23 (10.67; 32.18)
Starches	0	0	0	0	0
Other processed culinary ingredients	1 (0.11)	0.09 (0.01; 0.62)	0	0	0.92 (0.13; 6.22)
Processed foods	100 (11.33)	2.62 (1.87; 3.67)	2.54 (1.80; 3.57)	3.65 (2.75; 4.85)	7.95 (6.58; 9.59)
Bread	2 (0.23)	0	0.10 (0.10; 6.62)	0.98 (0.13; 6.62)	1.96 (0.49; 7.50)
Cheese	0	0	0	0	0
Processed meats	4 (0.45)	0	0.84 (0.11; 5.76)	2.54 (0.82; 7.58)	3.38 (1.27; 8.68)
Other processed meats	94 (10.65)	3.19 (2.28; 4.45)	2.90 (2.03; 4.12)	4.06 (3.01; 5.45)	9.09 (7.49; 11.01)
Ultra-processed products	772 (87.43)	10.07 (9.29; 10.91)	9.48 (8.72; 10.29)	2.10 (1.75; 2.52)	14.37 (13.46; 15.34)
Sausages and other reconstituted meat products	37 (4.19)	0	7.02 (4.62; 10.53)	10.37 (7.38; 14.36)	12.37 (9.09; 16.61)
Sweet biscuits	86 (9.74)	17.42 (14.16; 21.24)	9.95 (7.49; 13.11)	0.68 (0.21; 2.08)	19.45 (16.02; 23.41)
Savory biscuits	68 (7.70)	1.63 (0.08; 3.23)	8.77 (6.57; 11.62)	5.91 (4.14; 8.38)	13.87 (11.09; 17.23)
Margarine	9 (1.02)	0	47.37 (26.77; 68.89)	5.26 (0.73; 29.39)	47.37 (26.77; 68.89)
Cakes and pies	89 (9.74)	23.58 (19.34; 28.42)	20.89 (16.87; 25.58)	0.30 (0.04; 2.08)	26.57 (22.11; 31.55)
Sliced bread	8 (0.91)	0	0.64 (0.16; 2.53)	1.92 (0.86; 4.22)	2.57 (1.29; 5.05)
Candies in general	86 (9.74)	12.80 (10.41; 15.63)	3.31 (2.17; 5.03)	0	13.58 (11.13; 16.48)

Carbonated soft drinks	6 (0.68)	3.48 (1.57; 7.54)	0	0	3.48 (1.57; 7.54)
Chocolate	186 (21.06)	42.21 (37.44; 47.12)	45.47 (40.64; 50.39)	0	46.73 (41.87; 51.65)
Noodles	2 (0.23)	0	0	1.85 (0.46; 7.10)	1.85 (0.46; 7.10)
Ready-to-eat meals	18 (2.04)	0.06 (0.01; 0.23)	2.40 (1.20; 4.72)	3.30 (1.83; 5.86)	5.40 (3.43; 8.41)
Non-carbonated sweetened beverages	18 (2.04)	3.33 (2.11; 5.23)	0.37 (0.09; 1.47)	0	3.48 (1.57; 7.54)
Dairy beverages	2 (0.23)	0.38 (0.05; 2.65)	0.38 (0.05; 2.65)	0	0.76 (0.19; 2.99)
Ice cream	25 (2.83)	10.74 (7.24; 15.65)	4.67 (2.53; 8.46)	0	11.68 (8.01; 16.71)
Sauces and condiments	57 (6.46)	2.83 (1.65; 4.82)	5.45 (3.71; 7.95)	5.67 (3.89; 8.20)	12.44 (9.72; 15.79)
Tabletop sweetener	0	0	0	0	0
Others UPPs	75 (8.49)	19.17 (15.32; 23.72)	21.23 (17.21; 25.91)	0.88 (0.28; 2.70)	22.12 (18.02; 26.85)
TOTAL	**883 (100.00)**	**8.41 (7.78; 9.10)**	**8.06 (7.44; 8.73)**	**2.32 (1.99; 2.71)**	**12.93 (12.15; 13.74)**

CI 95%: 95% Confidence Interval; FOPNL: Front-of-package Nutrition Labeling; *total of foods that already had FOPNL for at least one critical nutrient.

Table 3. The proportion of foods and beverages high in added sugar and declared added sugar information in the nutritional facts panel

Food Categories	**n (%)**	**High in added sugar**	**Declared added sugar information the nutrition facts***
Processed culinary ingredients	203 (2.52)	0.98 (0.24; 3.85)	0
Animal fat	52 (0.65)	0	0
Starches	42 (0.52)	0	0
Other processed culinary ingredients	109 (1.35)	1.83 (0.45;7.03)	0
Processed foods	1,257 (15.61)	38.02 (35.38; 40.74)	20.29 (16.92; 24.14)
Bread	102 (1.27)	48.00 (38.53; 57.68)	16.32 (8.37; 29.39)
Cheese	4 (0.05)	0	0
Processed meats	118 (1.47)	12.71 (7.81; 20.00)	13.33 (3.35; 40.55)
Other processed meats	1,033 (12.83)	40.00 (37.12; 43.09)	21.01 (17.35; 25.21)
Ultra-processed products	5,369 (66.68)	64.40 (63.11; 65.68)	33.54 (31.99; 35.13)
Sausages and other reconstituted meat products	299 (3.71)	76.25 (71.11; 80.73)	21.49 (16.63; 27.29)
Sweet biscuits	442 (5.49)	92.53 (89.68; 94.64)	28.36 (24.20; 32.92)
Savory biscuits	490 (6.09)	59.9 (54.97; 63.65)	31.27 (26.20; 36.83)

Margarine	19 (0.24)	10.53 (2.64; 33.74)	50.00 (5.88; 94.11)
Cakes and pies	335 (4.16)	91.64 (88.15; 94.17)	34.20 (29.11; 39.68)
Sliced bread	311 (3.86)	67.20 (61.78; 72.19)	48.32 (41.62; 55.09)
Candies in general	633 (7.86)	72.19 (68.57; 75.54)	28.88 (24.91; 33.21)
Carbonated soft drinks	172 (2.14)	69.76 (62.49; 76.16)	37.50 (29.31; 46.47)
Chocolate	398 (4.94)	95.72 (93.23; 97.34)	55.11 (50.08; 60.04)
Noodles	108 (1.34)	10.18 (5.72; 17.46)	0
Ready-to-eat meals	333 (4.14)	48.64 (43.31; 54.01)	31.48 (24.80; 39.03)
Non-carbonated sweetened beverages	539 (6.69)	41.37 (37.28; 45.58)	26.90 (21.49; 33.11)
Dairy beverages	262 (3.25)	32.82 (27.40; 38.74)	38.37 (28.73; 49.02)
Ice cream	214 (2.66)	73.83 (67.53; 79.28)	18.35 (13.06; 25.17)
Sauces and condiments	458 (5.69)	49.34 (44.78; 53.91)	25.66 (20.38; 31.75)
Tabletop sweetener	17 (0.21)	35.29 (16.78; 59.59)	16.66 (2.28; 63.14)
Others UPPs	339 (4.21)	53.68 (48.35; 58.93)	42.85 (35.86; 50.15)
Total	**6,829 (100.00)**	**57.66 (56.49; 58.83)**	**31.91 (30.48; 33.39)**

*Proportion calculated only when the product was considered high in sugar according to the criteria of RDC nº 429/2020

Table 4. The proportion (95% CI) of food and beverages with FOPNL for at least one critical nutrient by type of launch in Brazilian food retail.

Grupos de alimentos	**Proportion (95% CI) with FOPNL by type of launch**				
	New package	**New formulation**	**New variety**	**New product**	**Relaunch**
Processed culinary ingredients	3.66 (1.38; 9.37)	0	2.70 (0.37; 16.85)	8.51 (3.23; 20.58)	20.00 (5.04; 54.07)
Animal fat	0	0	16.67 (2.28; 63.13)	33.33 (13.08; 62.41)	50.00 (5.88; 94.11)
Starches	0	0	0	0	0
Other processed culinary ingredients	0	0	0	0	25.00 (3.35; 76.22)
Processed foods	11.77 (9.15; 15.02)	0	3.72 (2.17; 6.30)	6.01 (3.98; 8.96)	14.92 (8.22; 25.57)
Bread	0	0	4.00 (0.56; 23.55)	2.85 (0.40; 17.69)	0
Cheese	0	0	0	0	0
Processed meats	4.22 (1.36; 12.29)	0	0	0	33.33 (4.33; 84.65)
Other processed meats	14.32 (11.08; 18.31)	0	3.93 (2.24; 6.79)	6.90 (4.54; 10.36)	16.36 (8.73; 28.55)
Ultra-processed products	18.75 (17.11; 20.51)	17.81 (10.63; 28.29)	9.93 (8.43; 11.67)	11.58 (9.78; 13.66)	13.99 (11.87; 16.43)
Sausages and other reconstituted meat products	6.72 (3.39; 12.87)	14.28 (1.96; 58.06)	9.75 (4.95; 18.31)	19.05 (9.82; 33.70)	24.48 (14.46; 38.34)
Sweet biscuits	21.55 (15.97; 28.43)	16.66 (2.28; 63.13)	11.76 (6.80; 19.58)	23.80 (14.89; 3.58)	21.15 (14.35; 30.04)
Savory biscuits	16.86 (11.97; 23.21)	0	7.01 (3.54; 13.40)	13.51 (8.31; 21.21)	17.77 (11.18; 27.07)
Margarine	63.63 (33.87; 85.67)	0	100.0	0	33.33 (4.33; 84.65)
Cakes and pies	29.05 (22.31; 36.86)	40.00 (10.02; 79.96)	16.90 (9.85; 27.45)	18.46 (10.79; 29.76)	43.47 (30.04; 57.94)
Sliced bread	4.04 (1.52; 10.27)	0	2.27 (0.56; 8.63)	1.85 (0.26; 12.00)	1.47 (0.21; 9.71)
Candies in general	16.37 (12.15; 21.71)	30.77 (12.03; 59.07)	7.35 (4.00; 13.12)	16.56 (11.53; 23.21)	8.42 (4.27; 15.94)
Carbonated soft drinks	5.47 (2.07; 13.70)	0	4.87 (1.22; 17.52)	0	0
Chocolate	61.01 (53.64; 67.92)	0	38.05 (29.58; 47.31)	30.51 (20.14; 43.31)	38.63 (25.54; 53.60)
Noodles	5.12 (1.28; 18.32)	0	0	0	0
Ready-to-eat meals	11.00 (6.19; 18.78)	0	2.10 (0.52; 8.02)	3.48 (1.13; 10.26)	4.17 (1.04; 15.19)
Non-carbonated sweetened beverages	4.73 (2.56; 8.58)	0	1.43 (0.36; 5.56)	4.85 (2.03; 11.13)	1.25 (0.17; 8.34)
Dairy beverages	1.03 (0.14; 6.95)	25.00 (3.35; 76.22)	0	0	0

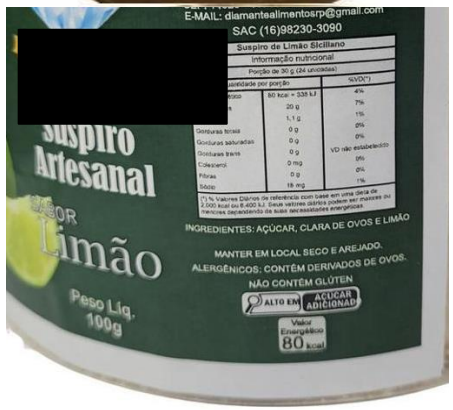
Ice cream	11.67 (5.66; 22.51)	25.00 (3.35; 76.22)	11.27 (5.73; 20.97)	8.16 (3.09; 19.81)	16.67 (7.11; 34.31)
Sauces and condiments	17.93 (13.03; 24.15)	0	6.54 (3.15; 13.09)	7.40 (3.36; 15.52)	13.58 (7.68; 22.88)
Tabletop sweetener	0	0	0	0	0
Others UPPs	30.07 (22.89; 38.38)	60.00 (20.03; 89.97)	17.28 (10.51; 27.09)	9.78 (5.16; 17.74)	32.14 (17.64; 51.14)
Total	16.87 (15.48; 18.36)	16.05 (9.55; 25.70)	8.51 (7.27; 9.93)	10.09 (8.65; 11.75)	14.12 (12.07; 16.46)

CI 95%: 95% Confidence Interval; FOPNL: Front-of-package Nutrition Labeling

Figure 1. Evolution of the prevalence of front-of-pack nutritional labeling implementation and eligible products over the months during the monitoring period.

Table 1. Characterization and illustrations of non-compliance in Brazilian products with FOPNL from 11/09/2022 to 06/09/2023

FOPNL rules in Brazil	Non-Compliance	Examples
To be printed in 100% black color on a white background.	0.50% of the products used color standards different from the recommended.	

To be in the top half of the main panel, on a single continuous surface. To have the same text orientation as the other information on the label.	41.30% of the analyzed products had the FOPNL positioned laterally, and this occurred almost always on cylindrical-shaped packages. Although rare, in 1% of the sample, the FOPNL was found on the back of the packages.	 

To follow the models defined in Annex XVII of IN nº75, 2020. To observe the specific formatting requirements defined in Annex XVIII of IN nº 75, 2020, the FOPNL must not be in covered areas, removable by opening the seal, or difficult to view, such as sealing and twisting areas.	12.05% of the products analyzed had removable labels for the FOPNL or the FOPNL was in a covered area.	 

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CAB: Conceptualization, Formal analysis, Writing – original draft; CK, BSN, MNPCL, MR: Formal analysis and review; APB, LAM and ACD: Writing – review & editing; APB and ACD: Supervision.

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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.