


### RESEARCH ARTICLE

## Food availability and advertising within food outlets around primary healthcare services in Brazil

Paula M. Horta\* , Juliana de P. M. Souza, Patrícia P. Freitas and Aline C. S. Lopes

*Departamento de Nutrição, Universidade Federal de Minas Gerais, Belo Horizonte, Minas Gerais, Brazil*

*(Received 17 February 2020 – Final revision received 25 September 2020 – Accepted 7 October 2020)*

*Journal of Nutritional Science* (2020), vol. 9, e49, page 1 of 5

doi:10.1017/jns.2020.45

### Abstract

The consumer food environment is changing: an extensive variety of foods are now available in most markets, offering palatability, convenience and novelty. However, little is known about the availability and advertising of food items within food outlets, especially among developing countries. The present study examined these dimensions in 281 food outlets located around eighteen primary healthcare services in Belo Horizonte, Brazil, in 2013. These establishments were classified as large-chain supermarkets; specialised fruits and vegetable (F&V) markets; and local grocery stores, convenience stores or bakeries. Availability of F&V, availability of ultra-processed foods (UPF) and food advertising were compared across the food outlet categories by applying the  $\chi^2$  test. Almost 60 % of the food outlets were specialised F&V markets, 21.4 % were large-chain supermarkets and 19.2 % were local grocery stores, convenience stores or bakeries. Almost 80 % contained at least eight types of fruits and vegetables, and 60 % contained UPF. Food advertisement was absent in 59.8 % of the food outlets, 19.6 % were advertising only F&V and 17.4 % were advertising only UPF. Higher F&V availability was noted inside specialised F&V markets and large-chain supermarkets than local grocery stores, convenience stores or bakeries. Advertising of F&V was more common within specialised F&V markets. However, large-chain supermarkets and local grocery stores, convenience stores or bakeries contained more frequent UPF food advertising isolated: 38.3 and 35.2 %, respectively. Therefore, the availability and advertising of food items within food outlets around primary healthcare services are different according to the type of food outlet.

**Key words:** Food marketing: Ultra-processed foods: Fruit and vegetables: Food consumer environment

### Introduction

Eating habits are influenced by a combination of individual factors and characteristics of the food environment, such as the availability, accessibility, affordability, desirability, convenience, marketing, and the properties of food sources and products<sup>(1–4)</sup>. The International Network for Food and Obesity/Non-Communicable Diseases (NCDs) Research, Monitoring and Action Support (INFORMAS) is a global network of public interest organisations and researchers from different countries that aims to monitor, benchmark, and support public and private sector actions to increase healthy food environments and reduce obesity, diet-related NCDs, and their related inequalities<sup>(5)</sup>. INFORMAS developed modules for which the monitoring frameworks have

been designed and the indicators determined, including the food retail environment module<sup>(6)</sup>.

The food retail environment can be divided into the community food environment (the type, availability and accessibility of food outlets) and consumer food environment (the availability, prices, promotions and nutritional quality of products available within stores)<sup>(6,7)</sup>. The food retail environment is changing: an extensive variety of food and beverages are now available in most markets, offering palatability, convenience and novelty. However, at the same time, the extensive availability and advertising of such products, and especially those with unbalanced nutrient content, challenge efforts to eat healthily<sup>(8–10)</sup>.

Within the food consumer environment, food availability refers to whether a product is present or not within a food

\* Corresponding author: Paula M. Horta, email [paulamhorta@gmail.com](mailto:paulamhorta@gmail.com)



store, and usually, food availability is associated with food advertising, i.e. only food items that are present within a food store are advertised<sup>(11)</sup>. Food advertising within food outlets involves messages on packaging or signage, shelf labelling, and product samples and is a dimension of the consumer food environment that is little investigated<sup>(12,13)</sup>. A systematic review of fifty-six primary, quantitative and observational studies, published from 2000 to 2011, concluded that none of the studies mentioned advertising within food retail outlets and the influence of marketing strategies on an individual's food choices<sup>(14)</sup>.

In Brazil, food advertising is recognised as an obstacle to healthy eating by the Dietary Guidelines for the Brazilian Population since it promotes unhealthy foods more frequently than healthy foods<sup>(15)</sup>. Several studies evaluated food advertising on Brazilian television channels<sup>(16,17)</sup> and on the Internet<sup>(18)</sup>, but there is little evidence about food advertising within Brazilian food outlets. To our knowledge, only one cross-sectional survey conducted in thirteen districts across the city of Sao Paulo in 2010–2011 examined this aspect of the consumer food environment. The study found that signage or promotion of ultra-processed foods (UPF) was uniformly found across stores, while fruit and vegetable (F&V) promotion was thirteen times less likely to be found at locally owned grocery stores and corner stores<sup>(19)</sup>.

As is prevalent worldwide, Brazil faces alarming obesity and NCDs occurrence<sup>(20)</sup>. Consequently, multisectoral actions that promote healthy eating and physical activity have been proposed in the country including the Health Academy Program (PAS: Programa Academia da Saúde). This initiative was created in 2011 and consists of primary healthcare services allocated in socially vulnerable regions that offer physical activity and healthy eating guidance at no cost to its participants. PAS is mainly utilised by older women and individuals who have low levels of education and are overweight<sup>(21)</sup>. Since the food environment can impact individuals' food choices<sup>(1–4)</sup>, in addition to describing the programme effectiveness in changing its users' behaviours, it is also interesting to understand how the PAS food environment is characterised. One previous study already showed that the PAS food environment is recognised as adequate in F&V diversity and variety and excessive in UPF<sup>(22)</sup>. The present study intended to advance research on this topic and aimed to describe the advertising and the availability of food items within food outlets around PAS units.

## Methods

The present study was conducted in the neighbourhoods of eighteen PAS units in Belo Horizonte from April to September 2013. The city is the sixth largest in Brazil and the eighth largest in Latin America, with an estimated population of 2 501 576<sup>(23)</sup>.

In the sampling process, 42 of the 50 PAS units installed in the municipality were considered. Six units located in areas of low health vulnerability were excluded due to their reduced number in the municipality. Two additional units were excluded because they have participated in a previous

intervention study. Thus, eighteen (42.8 %) units distributed through the nine regions of the municipality were randomly assigned, representing the total with a confidence level of 95 and 1.4 % error. More information about methods and sampling can be seen in a previous publication<sup>(24)</sup>.

To define the food environment, establishments that traded F&V within a buffer with a 1600-m radius around each PAS unit sampled were selected. Open-air food markets were not included. The food outlets were included in the study if their owners allowed data collection. The ArcView buffer tool (Esri, Redlands, CA, USA) was chosen to create these buffers.

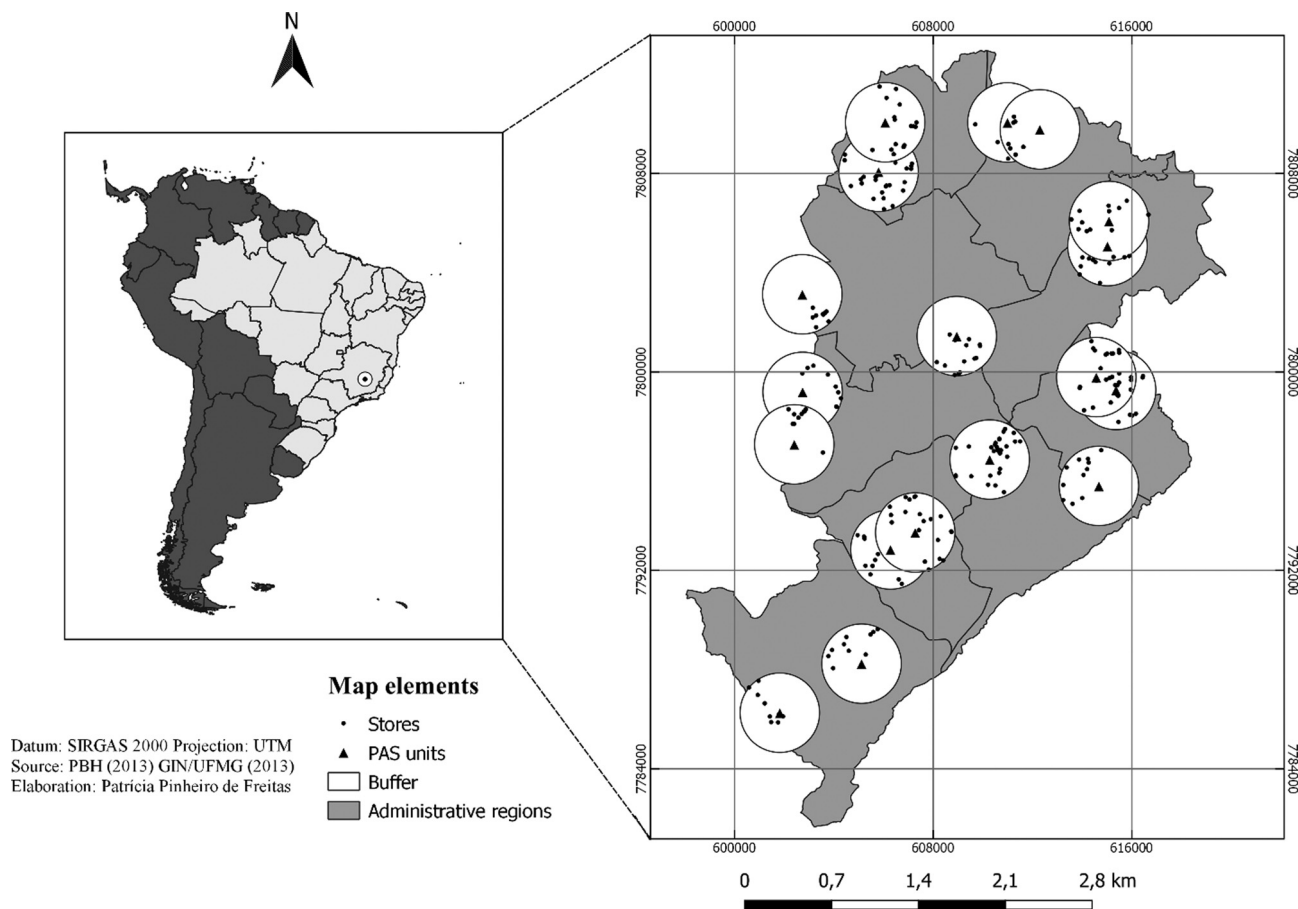
In total, our sample comprised 281 establishments (Fig. 1) which were classified into the following categories: large-chain supermarkets; specialised F&V markets and local grocery stores, convenience stores or bakeries. These food stores were classified in accordance with the following:

- Availability of F&V: among the types most consumed in the municipality<sup>(25)</sup> – fruits: banana, orange, papaya, watermelon, apple, mango, pineapple, tangerine, grape, melon, pumpkin; vegetables: chayote, tomato, carrot, lettuce, zucchini, cabbage, beetroot, kale, okra.
- Availability of UPF: among the types most consumed by Brazilians<sup>(25)</sup> – regular soda, fruit-flavoured drinks and juice/nectars with added sugar, cream-filled chocolate cookies and corn chips snacks.
- Food advertising: by checking the presence of signs with nutrition information, signs or other displays that encourage the purchase or the eating of food products, and discounts<sup>(25)</sup>. Food advertisement was analysed separated for only F&V advertising (any type, except tubers, roots and frozen food), only UPF advertising (regular soda, fruit-flavoured drinks and juice/nectars with added sugar, cream-filled chocolate cookies and corn chips snacks), and both F&V and UPF advertising<sup>(25)</sup>.

UPF is defined as industrial formulations that result from a series of industrial processes and their ingredients often include sugar, oils, fats and salt, generally in combination, in addition to substances such as flavours, colours, emulsifiers and sweeteners<sup>(26,27)</sup>. We chose F&V as an indicator of healthy eating because of their high nutrient density, while UPF represented an unhealthy eating indicator by the unbalanced nutrient composition of these products<sup>(26)</sup>.

Food store types were compared in accordance with the availability of F&V, UPF and food advertising by applying the  $\chi^2$  test at 5 % significance level ( $P$ -value < 0.05). All analyses were performed with the statistical software package Stata/SE version 13.0.

The present study was conducted according to the guidelines in the Declaration of Helsinki and all procedures involving human subjects/patients were approved by the Universidade Federal de Minas Gerais Ethics Research Committee (0537.0.0203.000-11) and the Prefeitura Municipal de Belo Horizonte Ethics Research Committee (0537.0.0203.410-11A). Written informed consent was obtained from all subjects/patients.



**Fig. 1.** PAS (*Programa Academia da Saúde*) units and food stores selected.

## Results

The food outlets comprised mainly specialised F&V markets (59.4), 79.4 and 83.3 % of them contained at least eight types of F&V, respectively. UPF availability was seen in 60.9 % of establishments (Table 1).

Food advertisement was absent in 59.8 % of food outlets, 19.6 % were advertising only F&V and 17.4 % were advertising only UPF (Table 1).

Higher F&V availability was noted inside specialised F&V markets and large-chain supermarkets than local grocery stores, convenience stores or bakeries. UPF availability, on the other hand, was less common inside specialised F&V markets (38.3 %) (Table 1).

Food advertising was mostly absent inside specialised F&V markets (70.1 %). In the presence of food advertising, the promotion of only F&V was more common within specialised F&V markets. However, large-chain supermarkets and local grocery stores, convenience stores or bakeries contained more frequently UPF food advertising isolated: 38.3 and 35.2 %, respectively (Table 1).

## Discussion

The present study described the availability and advertising of food within food outlets in the neighbourhoods of PAS in Brazil. Specialised F&V markets had a higher availability of

F&V and the highest presence of only F&V advertising. Large-chain supermarkets also had high availability of F&V, although predominantly only UPF advertising. Local grocery stores, convenience stores or bakeries had less availability of F&V and a higher presence of UPF advertising.

Specialised F&V markets were the most common food outlets around PAS units and had higher F&V availability and advertising. Belo Horizonte, the metropolis examined in the present study, is an international reference for public policies on food and nutritional security focusing on the implementation of public establishments in deprived and low-income areas to ensure access to healthy eating, such as open-air markets and municipal markets, in addition to the promotion of population health through proper and healthy nutrition<sup>(28)</sup>.

Supermarkets are also singled out as inductors for the consumption of F&V, for presenting a greater variety, better quality and lower cost of these foods<sup>(29)</sup>. However, they are also known for containing high UPF variety and diversity<sup>(29)</sup>. In Brazil, near 60 % of the UPF acquisition is realised in supermarkets<sup>(30)</sup>. These facts can explain the simultaneous occurrence of high UPF availability and advertising and high F&V availability within these food outlets.

In contrast, local grocery stores, convenience stores or bakeries, contained an unhealthy status of food availability and advertising around the PAS units. In line with our findings, these food outlets are known as small food stores that offer an abundance of calorically high, nutrient-low foods.



**Table 1.** Characterisation of the food outlets around the PAS (*Programa Academia da Saúde*) units, Belo Horizonte, MG, Brazil, 2013

| Food consumer environment   | Total sample |      | Food outlets type               |      |                                 |      | P-value |   |        |
|-----------------------------|--------------|------|---------------------------------|------|---------------------------------|------|---------|---|--------|
|                             | N            | %    | Specialised F&V markets (N 167) |      | Large-chain supermarkets (N 60) |      |         | Local grocery stores, convenience stores or bakeries (N 54) |        |
|                             |              |      | N                               | %    | N                               | %    |         | N   | %      |
| Fruit availability          | 58           | 20.6 | 23                              | 13.8 | 11                              | 18.3 | 24      | 44.4  | <0.001 |
| 0–7 types                   | 223          | 79.4 | 144                             | 86.2 | 49                              | 81.7 | 30      | 55.6  |        |
| ≥8 types                    |              |      |                                 |      |                                 |      |         |   |        |
| Vegetables availability     | 47           | 16.7 | 14                              | 8.4  | 9                               | 15.0 | 24      | 44.4  | <0.001 |
| 0–7 types                   | 234          | 83.3 | 153                             | 91.6 | 51                              | 85.0 | 30      | 55.6  |        |
| ≥8 types                    |              |      |                                 |      |                                 |      |         |   |        |
| UPF availability            | 110          | 39.1 | 103                             | 61.7 | 1                               | 1.7  | 6       | 11.1  | <0.001 |
| No                          | 171          | 60.9 | 64                              | 38.3 | 59                              | 98.3 | 48      | 88.9  |        |
| Yes                         |              |      |                                 |      |                                 |      |         |   |        |
| Food advertisement          | 168          | 59.8 | 117                             | 70.1 | 20                              | 33.3 | 31      | 57.4  | <0.001 |
| Absent                      | 55           | 19.6 | 43                              | 25.8 | 9                               | 15.0 | 3       | 5.6   |        |
| Only F&V advertisement      | 49           | 17.4 | 7                               | 4.2  | 23                              | 38.3 | 19      | 35.2  |        |
| Only UPF food advertisement |              |      |                                 |      |                                 |      |         |   |        |
| F&V and UPF advertisement   | 9            | 3.2  | 0                               | 0.0  | 8                               | 13.3 | 1       | 1.9   |        |

F&V: fruit and vegetables; UPF: ultra-processed food.

Although they have more autonomy to define the type of food and advertising inside these types of food outlets, in comparison to corporate- and franchise-owned stores, independent stores retailers' face a more limited infrastructure for offering healthful food and beverages<sup>(29)</sup>.

The novelty of the present study lies in the description of food advertising inside food stores, evidence that is largely scarce in the literature<sup>(12,14)</sup> and especially in Latin America, where studies of the consumer food environment focus on evaluating and classifying food stores as healthy or unhealthy based on types of foods found in the stores<sup>(31)</sup>.

This knowledge has some significant public health implications since it identifies several public health actions. First, retailers can encourage consumers to choose products by pursuing a range of marketing and merchandising activities and, overall, they demonstrate a willingness to engage in healthy food retail and a desire for greater support from healthy food retail initiatives<sup>(32,33)</sup>. Characterising food outlets based on the availability and advertising of food items can generate actions focusing on stimulating the retailers to improve the healthiness of their establishments. Second, the present study highlights the importance of counselling consumers about the best places to buy foods (i.e. those with higher availability of F&V). Third, to improve PAS effectiveness, actions aiming to improve the retail food environment around these services are also needed. Reducing UPF food advertising inside large-chain supermarkets and local grocery stores, convenience stores or bakeries and substituting it for F&V advertising such as in-store coupons or specials, in-store tastings/recipe demonstrations, and displaying labels or signs on shelves that highlight healthier options are some examples of marketing strategies that attract consumers<sup>(34,35)</sup>.

However, the present study also has several limitations. The audited food stores were located within a defined radius around PAS units; other food environments may influence the participants, although at least three times a week the participants routinely attend these services. In addition, our data are from 2013, and food environments change over time: some stores open and others close, especially in a financial crisis. In the city where the study took place, no dramatic social intervention occurred since the study was conducted and before the recent COVID-19 pandemic. Nevertheless, the present study addresses a major aspect of the consumer food environment that is understudied and practically unknown in Brazil.

## Conclusions

The availability and advertising of food items within food outlets around PAS units are different according to the type of food outlet. In general, specialised F&V markets showed higher F&V advertising. Supermarkets, despite containing high availability of F&V, presented a high occurrence of only UPF advertising. Local grocery stores, convenience stores or bakeries were the food outlets with higher UPF availability and only UPF advertising.

## Acknowledgements

The present work was supported by the National Council for Scientific and Technological Development (CNPq; *Conselho*



Nacional de Desenvolvimento Científico e Tecnológico) and by the Foundation for Research of the State of Minas Gerais (FAPEMIG: *Fundação de Amparo à Pesquisa do Estado de Minas Gerais*). The present study was financed by scholarship by the Coordination for the Improvement of Higher Education Personnel (CAPES: *Coordenação de Aperfeiçoamento de Pessoal de Nível Superior*) and CNPq (researcher scholarship). CNPq, FAPEMIG and CAPES had no role in the design, analysis or writing of this article.

P. M. H. made substantial contributions to data analysis and data interpretation and wrote the manuscript. J. P. M. S. made substantial contributions to data analysis and data interpretation and wrote the manuscript. P. P. F. participated in study conception and design, data analysis and critically revised the article. A. C. S. L. participated in study conception and design and critically revised the article. All authors approved the final version to be published.

There are no conflicts of interest.

## References

- Glanz K, Sallis JF, Saelens BE, *et al.* (2005) Healthy nutrition environments: concepts and measures. *Am J Health Promot* **19**, 330–333.
- Caspi CE, Sorensen G, Subramaniana SV, *et al.* (2012) The local food environment and diet: a systematic review. *Health Place* **18**, 1172–1187.
- Pitt E, Gallegos D, Comans T, *et al.* (2017) Exploring the influence of local food environments on food behaviours: a systematic review of qualitative literature. *Public Health Nutr* **20**, 2393–2405.
- Swinburn BA, Kraak VI, Allender S, *et al.* (2019) The global syndemic of obesity, undernutrition and climate change: the Lancet Commission report. *Lancet* **393**, 791–846.
- Vandevijvere S, Swinburn BA & INFORMAS (2014) Towards global benchmarking of food environments and policies to reduce obesity and diet-related non-communicable diseases: design and methods for nation-wide surveys. *BMJ Open* **4**, e005339.
- Ni Mhurchu C, Vandevijvere S, Waterlander W, *et al.* (2013) Monitoring the availability of healthy and unhealthy foods and non-alcoholic beverages in the community and consumer retail food environments globally. *Obes Rev* **14**, 108–119.
- Glanz K, Johnson L, Yaroch AL, *et al.* (2016) Measures of retail food store environments and sales: review and implications for healthy eating initiatives. *J Nutr Educ Behav* **48**, 280–288.
- Filomena S, Scanlin K & Morland KB (2013) Brooklyn, New York foodscape 2007–2011: a five-year analysis of stability in food retail environments. *Int J Behav Nutr Phys Act* **10**, 46.
- Chen HJ & Wang Y (2014) The changing food outlet distributions and local contextual factors in the United States. *BMC Public Health* **14**, 42.
- James P, Seward MW, O'Malley AJ, *et al.* (2017) Changes in the food environment over time: examining 40 years of data in the Framingham heart study. *Int J Behav Nutr Phys Act* **14**, 84.
- Turner C, Aggarwal A, Walls H, *et al.* (2018) Concepts and critical perspectives for food environment research: a global framework with implications for action in low- and middle-income countries. *Global Food Security* **18**, 93–101.
- Pulker CE, Thornton LE & Trapp GSA (2018) What is known about consumer nutrition environments in Australia? A scoping review of the literature. *Obes Sci Pract* **4**, 318–337.
- Cairns G (2019) A critical review of evidence on the sociocultural impacts of food marketing and policy implications. *Appetite* **136**, 193–207.
- Gustafson A, Hankins S & Jilcott S (2012) Measures of the consumer food store environment: a systematic review of the evidence 2000–2011. *J Community Health* **37**, 897–911.
- Brazil A (2014) *Ministry of Health. Dietary Guidelines for the Brazilian Population*. Brasilia, Brazil: Ministry of Health.
- Guimarães JS, Mais LA, Villamarin FHML, *et al.* (2020) Ultra-processed food and beverage advertising on Brazilian television by INFORMAS benchmark. *Public Health Nutr* **23**, 2657–2662.
- Santana MO, Guimarães JS, Leite FHM, *et al.* (2020) Analysing persuasive marketing of ultra-processed foods on Brazilian television. *Int J Public Health* **65**, 1067–1077. doi: 10.1007/s00038-020-01456-6.
- Horta PM, Rodrigues FT & Santos LC (2018) Ultra-processed food product brands on Facebook pages: highly accessed by Brazilians through their marketing techniques. *Public Health Nutr* **21**, 1515–1519.
- Duran AC, Lock K, Latorre MR, *et al.* (2015) Evaluating the use of in-store measures in retail food stores and restaurants in Brazil. *Rev Saude Publica* **49**, 80.
- Flores-Ortiz R, Mata DC & Velasquez-Melendez G (2019) Adult body weight trends in 27 urban populations of Brazil from 2006 to 2016: a population-based study. *PLoS ONE* **14**, e0213254.
- Costa BVL, Mendonça RD, Santos LC, *et al.* (2013) City academy: a health promotion service in the healthcare network of the unified health system. *Ciênc Saúde Coletiva* **18**, 95–102.
- Freitas P, Menezes MC & Lopes ACS (2019) Consumer food environment and overweight. *Nutrition* **66**, 108–114.
- Instituto Brasileiro de Geografia e Estatística (2018). Panorama municípios brasileiros. <https://cidades.ibge.gov.br/brasil/mg/belo-horizonte/panorama> (accessed November 2018).
- Costa BVL, Freitas PP, Menezes MC, *et al.* (2018) Ambiente alimentar: validação de método de mensuração e caracterização em território com o Programa Academia da Saúde. *Cad Saude Pública* **34**, 00168817.
- Instituto Brasileiro de Geografia e Estatística (2011) *Pesquisa de Orçamentos Familiares 2008 to 2009: Análise do Consumo Alimentar Pessoal no Brasil*, 160 p. Rio de Janeiro: IBGE.
- Monteiro CA, Levy RB, Claro RM, *et al.* (2010) A new classification of foods based on the extent and purpose of their processing. *Cad Saude Publica* **26**, 2039–2049.
- Monteiro CA, Cannon G, Levy R, *et al.* (2016) NOVA. The star shines bright. *World Nutr* **7**, 28–38.
- Lopes ACS, Menezes MC & de Araújo ML (2017) Food environment and access to fruits and vegetables: “a metropolis into perspective”. *Saude Soc* **26**, 764–773.
- Winkler MR, Lenk KM, Caspi C, *et al.* (2019) Variation in the food environment of small and non-traditional stores across racial segregation and corporate status. *Public Health Nutr* **22**, 1624–1634.
- Machado PP, Claro RM, Martins APB, *et al.* (2018) Is food store type associated with the consumption of ultra-processed food and drink products in Brazil? *Public Health Nutr* **21**, 201–209.
- Perez-Ferrer C, Auchincloss AH, de Menezes MC, *et al.* (2019) The food environment in Latin America: a systematic review with a focus on environments relevant to obesity and related chronic diseases. *Public Health Nutr* **22**, 3447–3464.
- Houghtaling B, Serrano EL, Kraak VI, *et al.* (2019) A systematic review of factors that influence food store owner and manager decision making and ability or willingness to use choice architecture and marketing mix strategies to encourage healthy consumer purchases in the United States, 2005–2017. *Int J Behav Nutr Phys Act* **16**, 5.
- Martínez Steele E, Juul F, Neri D, *et al.* (2019) Dietary share of ultra-processed foods and metabolic syndrome in the US adult population. *Prev Med* **125**, 40–48.
- Sutton K, Caldwell J, Yoshida S, *et al.* (2019) Healthy food marketing and purchases of fruits and vegetables in large grocery stores. *Prev Med Rep* **14**, 100861.
- Moore LV, Pinard CA & Yaroch AL (2016) Features in grocery stores that motivate shoppers to buy healthier foods, ConsumerStyles 2014. *J Community Health* **41**, 812–817.