Short Communication

Digital food environment of a Brazilian metropolis: food availability and marketing strategies used by delivery apps

Paula Martins Horta*, Juliana de Paula Matos Souza, Luana Lara Rocha [ID] and Larissa Loures Mendes [ID]

Departamento de Nutrição, Universidade Federal de Minas Gerais, Av. Alfredo Balena 190, 30130-100 Escola de Enfermagem, 3° andar, Belo Horizonte, MG, Brasil

Abstract

Objective: Food delivery apps represent an important and emerging dimension of the digital food environment. This study aimed to examine food availability and the use of marketing strategies by two food delivery apps in a Brazilian metropolis.
Design: An exploratory study was conducted in the city of Belo Horizonte, Minas Gerais. Food groups were identified and the use of price discounts and photos by the apps was observed.
Setting: Eighteen neighbourhoods and the ten best rated restaurants in each app.
Participants: Three hundred sixty-two commercial food establishments.
Results: The proportion of ultra-processed beverages on offer in the apps (78·45 %) was much higher in comparison with water (48·89 %), natural juices or smoothies (27·07 %). Ultra-processed ready-to-eat meals represented almost 70 % of the food offered in the establishments' menus, while traditional meals and vegetables represented just over 30 % of the offering. Ice cream, candies and salty packaged snacks were nine times more frequently presented than fruits. The use of photos and price discounts prevailed predominantly among ultra-processed beverages, sandwiches and ice cream, candies and salty packaged snacks. These marketing strategies were least used for promoting fruits and vegetables.
Conclusions: Restaurants registered on food delivery apps offered a significant amount of ultra-processed foods with price discounts and photos in comparison with unprocessed and minimally processed foods.

The nutritional value and quality of the Brazilian peoples' diet have deteriorated over the last few decades[1–6]: the consumption of ultra-processed food increased, while the intake of unprocessed and minimally processed food decreased[4]. Simultaneously, the number of overweight and obese people increased in the country; in 2019, 55·4 and 20·3 % of the adults living in Brazilian capitals were, respectively, affected[7].

To understand the reasons for these dietary changes, studies have focused on the influence of the food environment on individuals' food consumption and nutritional patterns[8,9]. The food environment is defined as the consumer's interface with the food system that encompasses the availability, affordability, convenience and desirability of foods[10–12]. With internet access eased greatly by mobile

phones and changes in the lifestyles of urban populations, some features of the food environment have been digitalised. The digital food environment goes beyond social media, digital health promotion interventions and digital food marketing and covers food delivery apps as well[13].

In Brazil, a few studies have assessed the food environment,[14–17] but none have described food availability through food delivery apps. In Brazil, in 2017, one in every three internet users had downloaded a food delivery app on their smartphones[18]. Almost half the app users (49 %) are from least disadvantaged groups, whilst 44 and 7 % are from the middle and most disadvantaged groups, respectively[19].

People use these apps to order food mostly when they are at work, unwilling to go out, lack of time/skill to cook,

are attracted by sales promotions and/or are experiencing bad weather[20]. The main attraction of food delivery apps is their practicality and convenience, enabling the purchase of food without having to leave the house or workplace[21]. Although traditional telephone ordering remains a common method of ordering food[21], food delivery apps are more convenient and user-friendly as the desired items can be selected and ordered easily through the mobile app, which are then delivered in a short time[20].

These apps also use various marketing strategies to boost sales, such as price discounts, combos and free shipping. They make direct contact with their customers by sending Short Message Service and e-mails and by advertising on social media[21].

This study aimed to examine food availability and the use of marketing strategies by two food delivery apps in a Brazilian metropolis.

Methods

This is an exploratory study conducted in the city of Belo Horizonte, Minas Gerais. Primary data came from restaurants registered with two food delivery apps. Belo Horizonte is the sixth largest city in Brazil and the eighth in Latin America, with an estimated population of 2 512 070[22].

To avoid publicising the two selected platforms to the detriment of the others, the names of the services from which the data were obtained are withheld and remain undisclosed.

Two neighbourhoods from each of the nine administrative regions of the city were randomly selected (n 18), and all of them were covered by the two delivery apps studied.

For data collection, we tested the apps coverage of the eighteen selected neighbourhoods in February 2019. The tests were carried out on one weekday and on one day of the weekend and during three different periods representing lunchtime (11:00 hours to 13:00 hours), snack time (16:00 hours to 18:00 hours) and dinner (20:00 hours to 22:00 hours).

In each data collection period, researchers registered the ten best-rated restaurants in each neighbourhood and each app. This represented the first wave of data collection in which 2160 restaurants were identified. However, most of them announced offers more than once a day and on both days of data collection. In addition, the restaurants were not restricted to a single neighbourhood and could be registered on both apps. After excluding the repeated restaurants, a total of 415 different establishments composed the sample.

Then, we conducted the second wave of data collection that consisted of capturing all the restaurants' menus. This occurred 15–30 d after the first wave. Of the 415 restaurants included in the study, 53 (12·8 %) were considered sample loss either because their menu was no longer available for

review or because the restaurant was not covering the neighbourhood in the second wave of data collection. Thus, the final sample comprised 362 restaurants.

Foods announced on the restaurants' menus were classified into the following food groups: traditional meals (dishes predominantly made with unprocessed and minimally processed foods very typical in Brazil); water; natural juices and smoothies; vegetables; fruits; ultra-processed beverages; ice cream and candies; sandwiches; fried savoury snacks and pizzas (Table 1).

Data tabulation was conducted by four trained researchers. A subsample of 10 % of the restaurants was selected, and data were compared with test data consistency. The comparisons between both databases resulted in 100 % consistency.

Data analysis entailed estimation of the representation (%) of food groups and the use (%) of price discounts and photos at 95 % CI. Food groups were equally distributed across the days and the times of data collection. Data were organised with the aid of the EpiInfo version 7 program, and the statistical analysis was conducted using the Stata version 12.0.

Results

Ultra-processed beverages offered in the apps were higher at 78·45 %, than water (48·89 %) and natural juices or smoothies (27·07 %). Ice cream, candies and salty packaged snacks comprised 42·82 % of the menus, whilst fruits were at 4·70 %. Sandwiches, fried savoury snacks and pizzas made up almost 70 % of the offers in the establishments' menus. In contrast, traditional meals and vegetables comprised 20·44 and 16·85 %, respectively, of the menus (Table 2).

As for marketing strategies, restaurants used photos when presenting 35·36 % of the ultra-processed beverages, 29·00 % of the ice cream, candies and salty packaged snacks and 28·45 % of the sandwiches. On the other hand, only 2·76 % of fruits were presented with photos in the menus (Table 3).

The majority of price discounts were also offered on ultra-processed beverages and sandwiches on the menus: 27·07 and 23·48 %, respectively. For water, vegetables, natural juice and smoothies and traditional meals, discounts offered on the restaurants' menus were below 5 % for each (Table 3).

Discussion

This study is the first to review the profile of food offered in restaurant menus registered on food delivery apps in Brazil. A significant number of ultra-processed foods were offered with price discounts and complemented by photos.

Table 1. Description of the food groups, Brazil, 2019

Food groups	Description
Water	Natural water bottled in traditional and carbonated versions.
Natural juices and smoothies	Fruit or vegetable juices and smoothies, e.g. orange juice, cabbage, pineapple and ginger juice.
Traditional meals	Dishes predominantly made with unprocessed and minimally processed foods, e.g. rice, beans, meat and vegetables.
Vegetables	Dishes made predominantly from vegetables, e.g. mix of salads and vegetable soup.
Fruits	Dishes made predominantly of fruits, e.g. fruit salad, apple and banana.
Ultra-processed beverages	Soft drinks, industrialised juices, energy drinks, tonic water and flavoured water.
Ice cream, candies and salty packaged snacks	Ice cream, popsicles, candies, chewing gum, sweets and industrialised chocolates and salty packaged snacks such as chips.
Sandwiches	Dishes based on bread and ultra-processed ingredients, e.g. hamburger and hot dogs.
Fried savoury snacks	Fried savoury snacks, e.g. croquette.
Pizzas	Pizzas made predominantly with ultra-processed ingredients, e.g. ham pizzas.

Table 2. Participation of food groups on menus of restaurants registered in food delivery apps, Belo Horizonte, Minas Gerais, 2019

Food groups	*n*	Frequency (%)	95 % CI
Water	177	48·89	43·72, 54·07
Natural juice and smoothies	98	27·07	22·47, 31·67
Traditional meals	74	20·44	16·27, 24·62
Vegetables	61	16·85	12·98, 20·72
Fruits	17	4·70	2·51, 6·88
Ultra-processed beverages	284	78·45	74·20, 82·71
Ice cream, candies and salty packaged snacks	155	42·82	37·70, 47·94
Sandwiches	141	38·95	33·90, 44·00
Fried savoury snacks	60	16·57	12·72, 20·42
Pizzas	50	13·81	10·24, 17·38

Table 3. Marketing strategies participation on menus of restaurants registered in food delivery apps, in accordance to food groups, Belo Horizonte, Minas Gerais, 2019

Food groups	Price discount			Photos		
	n	Frequency (%)	95 % CI	*n*	Frequency (%)	95 % CI
Water	0	0·00	–	51	14·09	10·47, 17·69
Natural juice and smoothies	10	2·76	1·07, 4·46	39	10·77	7·56, 13·98
Traditional meals	18	4·97	2·72, 7·22	52	14·36	10·73, 17·99
Vegetables	6	1·66	0·33, 2·98	34	9·39	6·37, 12·41
Fruits	2	0·55	−0·02, 1·32	10	2·76	1·07, 4·46
Ultra-processed beverages	98	27·07	22·47, 31·67	128	35·36	30·41, 40·31
Ice cream, candies and salty packaged snacks	46	12·71	9·26, 16·15	105	29·00	24·31, 33·70
Sandwiches	85	23·48	19·09, 27·87	103	28·45	23·78, 33·12
Fried savoury snacks	15	4·14	2·08, 6·21	42	11·60	8·29, 14·92
Pizzas	29	8·01	5·20, 10·82	30	8·29	5·43, 11·14

When performing a simple comparison between the presence of food groups on the menus, some points stand out: the higher presence of ultra-processed beverages instead of unprocessed beverages like water, natural juices and smoothies. Similarly, more ultra-processed ready-to-eat meals, such as sandwiches, pizzas and fried savoury snacks, were available on the menus, in comparison with traditional meals and vegetables. Moreover, there were more ice cream and candy varieties available on the menus than fruits. Also, marketing strategies were mainly directed to ultra-processed foods.

The literature points to a direct relationship between the use of advertising strategies and food consumption[23,24], and the results of this study indicate that food delivery apps promote the consumption of ultra-processed foods in Brazil, which goes against Brazilian dietary guidelines[25].

To date, there is only one study that has examined the food delivery app environment in the three cities of Chicago, Amsterdam and Melbourne. The authors sampled ten addresses in each city and found 4323 delivery options; like this study, they found that most deliveries were of unhealthy items, such as burgers and pizza[26].

Considering both study results, it can be surmised that strategies to deal with obesogenic environments must also extend to the digital food environment and policies should focus on initiatives that limit the wide availability and advertising of ultra-processed foods.

Finally, we present the study limitations and their implication on the results. First, the study was conducted in a state capital; for smaller cities, the profile of food supplied by delivery apps may be different. In addition, the study did not describe the menus offered by all the restaurants registered on the apps, since data were collected for 6 h/d and included only the best rated restaurants. Also, some foods could not be classified in any group. This happened with Japanese food and could have occurred with other types of dishes too. The study did not evaluate all the marketing strategies used by the apps, free shipping, combos and others. Similarly, the impact of food pricing was not factored in. All these limitations may have restricted this study by describing the entirety of the food delivery apps environment. Despite this, the study methodology was defined in ways to limit bias, such as collecting data from different neighbourhoods, on different days of the week and with varied mealtimes. Further investigations on the digital food environment are necessary to better describe the meals offered on food delivery apps. These should focus on the profile of food available on these platforms as well as on consumer involvement with marketing strategies.

Acknowledgements

References

1. Monteiro CA, Levy RB, Claro RM *et al.* (2011) Increasing consumption of ultra-processed foods and likely impact on human health: evidence from Brazil. *Public Health Nutr* **14**, 5–13.
2. Canella DS, Levy RB, Martins APB *et al.* (2014) Ultra-processed food products and obesity in Brazilian households (2008–2009). *PLoS ONE* **9**, e92752.
3. Souza JPM, Lima MM & Horta PM (2019) Diet quality among the Brazilian population and associated socioeconomic and demographic factors: analysis from the National Dietary Survey 2008–2009. *J Acad Nutr Diet* **119**, 1866–1874.
4. Martins APB, Levy RB, Claro RM *et al.* (2013) Increased contribution of ultra-processed food products in the Brazilian diet (1987–2009). *Rev Saúde Pública* **47**, 1–10.
5. Louzada MLC, Martins APB, Canella DS *et al.* (2015) Ultra-processed foods and the nutritional dietary profile in Brazil. *Rev Saúde Pública* **49**, 38.
6. Louzada MLC, Martins APB, Canella DS *et al.* (2015) Impact of ultra-processed foods on micronutrient content in the Brazilian diet. *Rev Saúde Pública* **49**, 45.
7. Brazil. Ministry of Health (2020) Vigitel Brazil 2019: surveillance of risk and protective factors for chronic diseases by telephone survey: estimates of frequency and socio-demographic distribution of risk and protective factors for chronic diseases in the capitals of the 26 Brazilian states and the Federal District in 2019. Brazil: Ministry of Health.
8. 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**, 3477–3464.
9. Turner C, Kalamatianou S, Drewnowski A *et al.* (2020) Food environments research in low- and middle-income countries: a systematic scoping review. *Adv Nutr* **11**, 387–397.
10. Glanz K, Sallis JF, Saelen BE *et al.* (2005) Healthy nutrition environments: concepts and measures. *Am J Health Promot* **19**, 330–333.
11. Swinburn B, Sacks G, Vandevijvere S *et al.* (2013) INFORMAS (International Network for Food and Obesity/non-communicable diseases Research, Monitoring and Action Support): overview and key principles. *Obes Rev* **1**, 1–12.
12. Downs SM, Ahmed S, Fanzo J *et al.* (2020) Food environment typology: advancing an expanded definition, framework, and methodological approach for improved characterization of wild, cultivated, and built food environments toward sustainable diets. *Foods* **9**, 532.
13. Granheim SI, Opheim E, Terragni L *et al.* (2020) Mapping the digital food environment: a scoping review protocol. *BMJ Open* **10**, e036241.
14. Mendes LL, Nogueira H, Padez C *et al.* (2013) Individual and environmental factors associated for overweight in urban population of Brazil. *BMC Public Health* **13**, 988.
15. Freitas PP, Menezes MC, & Lopes ACS (2019) Consumer food environment and overweight. *Nutrition* **66**, 108–114.
16. Borges CA, Cabral-Miranda W & Jaime PC (2018) Urban food sources and the challenges of food availability according to the Brazilian dietary guidelines recommendations. *Sustainability* **10**, 4643.
17. Menezes MC, Costa BVL, Oliveira CD *et al.* (2017) Local food environment and fruit and vegetable consumption: an ecological study. *Prev Med Rep* **5**, 13–20.
18. IBOPE – The Brazilian Institute of Public Opinion and Statistics (2017) One in three Brazilian use food delivery apps. http://ibopeconecta.com/um-em-cadatres-internautas-tem-app-de-delivery-de-comida/ (accessed December 2019).
19. Qualibest Institute (2018) Food consumption by food delivery apps. https://www.institutoqualibest.com/download/uso-de-apps-de-delivery-de-comida/ (accessed July 2020).
20. Maimaiti M, Zhao X, Jia M *et al.* (2018) How we eat determines what we become: opportunities and challenges

brought by food delivery industry in a changing world in China. *Eur J Clin Nutr* **72**, 1282–1286.

21. Yeo VCS, Goh SK & Rezaei S (2017) Consumer experiences, attitude and behavioral intention toward online food delivery (OFD) services. *J Retail Consum Serv* **35**, 150–162.

22. IBGE – The Brazilian Institute of Geography and Statistics (2019) Belo Horizonte – Minas Gerais. https://cidades.ibge.gov.br/brasil/mg/belo-horizonte/panorama (accessed December 2019).

23. Boyland EJ, Nolan S, Kelly B *et al.* (2016) Advertising as a cue to consume: a systematic review and meta-analysis of the effects of acute exposure to unhealthy food and nonalcoholic beverage advertising on intake in children and adults. *Am J Clin Nutr* **103**, 519–533.

24. Buchanan L, Kelly B & Yeatman H (2017) Exposure to digital marketing enhances young adults' interest in energy drinks: an exploratory investigation. *PLoS ONE* **12**. doi: 10.1371/journal.pone.0171226.

25. Brazil. Ministry of Health (2014) *Dietary Guidelines for the Brazilian Population*. Brasilia, Brazil: Ministry of Heath.

26. Poelman MP, Thornton L & Zenk SN (2020) A cross-sectional comparison of meal-delivery options in three international cities. *Eur J Clin Nutr*. Online ahead of print. doi: 10.1038/s41430-020-0630-7.