Food promoted on an online food delivery platform in a Brazilian metropolis during the coronavirus disease (COVID-19) pandemic: a longitudinal analysis

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Abstract

Objective: To analyse food advertised on an online food delivery (OFD) platform during 16 weeks of the COVID-19 pandemic in Brazil.
Design: Longitudinal study. We randomly selected foods advertised on the OFD app's home page, classifying the food items into: water; natural juices and smoothies; vegetables; fruits; traditional meals and pasta; ultra-processed beverages; ice cream, candies, and salty packaged snacks; sandwiches; savoury snacks; and pizza. We also registered the marketing strategies used to promote the food items, such as photos, discounts, 'combo deals', and messages on healthiness, value for the money, tastiness, and pleasure.
Setting: Belo Horizonte, Minas Gerais, Brazil.
Participants: 1593 food items.
Results: In general, the OFD platform most commonly promoted traditional meals and pasta, ultra-processed beverages, and sandwiches – these food groups were offered 20–25 % of the time during the 16 weeks. There were no promotions for water during the whole period, and the least common promotions were those for natural juices and smoothies, vegetables, and fruits (< 5 %). The most common food promotion strategies were photos (> 80 %) and discounts (> 95 %), while approximately 30 % of the offers featured combo deals. Messages on tastiness, pleasure and value for the money varied from 15 % to 40 %.
Conclusion: Although the OFD platform offered traditional meals and pasta, most of the foods and beverages advertised were unhealthy and promoted with persuasive strategies. This finding highlights a growing public health concern: an increase in unhealthy eating patterns during the pandemic.

Downs et al. defined *food environment* as the 'consumer interface with the food system that encompasses the availability, affordability, convenience, promotion and quality, and sustainability of foods and beverages in wild, cultivated, and built spaces that are influenced by the sociocultural and political environment and ecosystems within which they are embedded'[1].

Under this definition, food environments are dynamic and change over time[1]. Advances in digital technologies, especially the Internet and smartphones, have globalised our everyday food environments and updated diners' takeout options with ghost kitchens and elaborate online food delivery (OFD) platforms[2] (e.g. UberEATS, iFood), applications or websites that connect consumers, restaurants, and riders (also known as drivers or couriers); people read restaurants' menus online, order food and receive it at home or a place of their choosing[3,4]. Currently, the main users of OFD platforms are young people in urban or dense residential settings with higher educational qualifications and income[5–7].

Studies from many parts of the world have highlighted the wide range of unhealthy food items on offer on these platforms and their frequent use of strategies that promote unhealthy eating practices[8–11]. For example, many platforms use a combination of marketing strategies such as special offers, recommendations and 'combo' deals to maximise consumers' purchases. The marketing strategies invest heavily in machine learning-based algorithms that analyse consumer histories and behaviours[12].

Replacing fresh homemade dishes and meals with ultra-processed foods ordered online can worsen physical health by leading to weight gain and the risk of developing chronic conditions such as obesity, hypertension and diabetes[7,13]. Reliance on OFD platforms can negatively impact human diets, making them a worrisome public health issue[14]. Although OFD platforms are part of many people's modern food systems, they are not considered in many countries' current nutrition policies and regulations[12,14].

Concerns about the health impacts of OFD platforms increased dramatically during the pandemic. Since the first case recorded in Wuhan, China, countries of all continents have implemented protection measures to prevent further spread of the new coronavirus (SARS-CoV-2) that resulted in less physical contact between people[15]. These measures favoured the OFD platforms, since the delivery process is contactless[16,17]. In addition, OFD platforms have started several new initiatives to increase people's use of their app during the pandemic, such as supplying essentials to consumers, offering COVID-19 insurance to delivery partners, setting up pandemic relief funds and strictly adhering to hygiene standards at restaurants for all steps, including preparing, cooking and packaging of food[18].

Thus, clarifying OFD platforms' food environment during the pandemic is an important public health research issue. Brazil was hit hard by the COVID-19 pandemic[19], and this directly contributed to the 15 % increase in the number of downloads of OFD platforms registered in the first 2 weeks of March 2020[20]. A previous study has already described the food advertised on an OFD platform in twenty-seven cities during the pandemic's 13th and 14th weeks[21]. The present study advances in this subject by analysing the food items that have been continually offered and the combination of marketing strategies on the country's most popular OFD platform. We collected data in Belo Horizonte, Brazil's sixth-largest city with an estimated population of 5 million in its metropolitan region[22].

Methodology

This longitudinal study investigated food advertised on an OFD platform in Belo Horizonte, Brazil, for 16 weeks of the pandemic (from 6 April to 26 July 2020). We started our data collection from the same data point as in the previous study describing food advertised in twenty-seven Brazilian cities[20].

The OFD platform studied is a national company established in 2011, currently the biggest food tech company in Latin America. In 2019, the platform delivered an average of 13 million orders per month countrywide, and this number reached 39 million in March 2020, when more than 1·5 million downloads of its app were registered.

Context of the study: COVID-19 pandemic in Belo Horizonte

Brazil confirmed its first case of COVID-19 on 26 February 2020 in São Paulo. By 22 March, all states had at least one case[23]. Belo Horizonte confirmed its first case on 16 March 2020.

The COVID-19 context in Belo Horizonte during the study period is synthesised in Fig. 1(a) for the number of cases and Fig. 1(b) for the number of deaths due to the disease. Each information was available on the Belo Horizonte City Hall website (www.pbh.gov.br).

Regarding the measures implemented by the city mayor to control the spread of the disease, during the study period, all bars, restaurants, cafeterias and other food outlets selling ready-to-eat meals remained closed for dining in – only takeaway and delivery were provided. After the third week of the study, City Hall declared a state of calamity (Table 1).

Data collection

This study considered all the foods advertised on the app home page during the study period; we did not include items advertised only in the restaurants' full menus. Data collection took place on two randomly selected days (one weekday and one weekend day) from each week of the study period, providing 6372 advertised foods. On each selected day, we recorded the offers shown during lunch (11.00 to 13.00) and dinner (18.00 to 21.00). All the data were collected from the app's home page in a single moment using a screen capture tool and saved as PDF files for analysis.

A sample of the food promotions (n 1593; 25 %) was selected through a randomisation process stratified by the day of the week and mealtime.

Food items featured were classified into the following food groups: water; natural juices and smoothies; vegetables; fruits; traditional meals (dishes made predominantly with unprocessed or minimally processed foods commonly find in Brazil) and pasta; ultra-processed beverages; ice cream, candies, and salty packaged snacks; sandwiches; savoury snacks; and pizza (Table 2). We then identified these groups as predominantly healthy or unhealthy based on whether they contained ultra-processed foods according to the NOVA food classification system[24,25] and the Ministry of Health's Dietary Guidelines for the Brazilian Population[26].

We also investigated the marketing strategies used to persuade users to buy food items based on previous frameworks about advertising strategies with different media[27,28]. The various strategies leverage the power of advertising with endorsements and influencers (e.g. licensed characters, celebrities and awards), premium offers (e.g. buy-one-get-one-free offers, gifts, collectables and limited editions), and claims (e.g. messages emphasising sensory-based characteristics such as
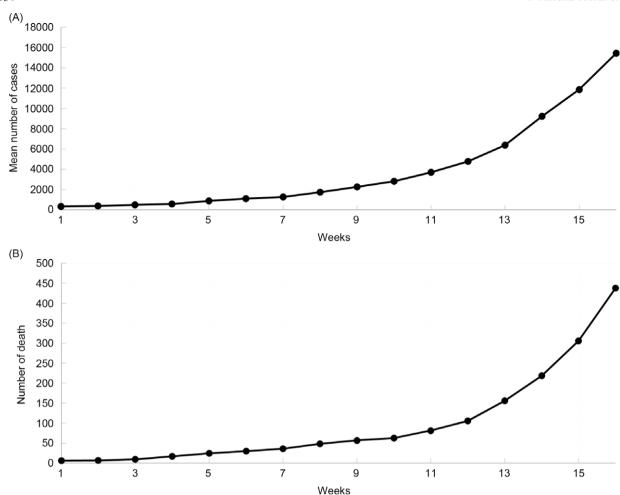
(A)

(B)

Fig. 1 The COVID-19 context in Belo Horizonte during the study period

Table 1 Municipal decrees specifying the protection measures implemented to contain the spread of the SARS-CoV-2 virus in Belo Horizonte

Week	Decree number	Content
1	17 325	Suspension of licence of bars, restaurants and cafeterias. Customers are prohibited from entering commercial establishments serving the public; such services can be availed only outside the establishments. Queues must be organised, ensuring a minimum distance of 1 m between two people.
1	17 328	Continued suspension of licence of bars, restaurants and cafeterias for an indefinite period. These establishments can offer delivery or takeaway service, provided they implement the measures stipulated by the health authorities.
2	17 332	Wearing of face mask mandatory in public places.
3	17 334	Declaration of a state of calamity.
4	17 348	Establishment of a working group to assess and plan the gradual and safe reopening of sectors whose activities have been suspended.
7	17 361	Gradual reopening of commerce, excluding bars, restaurants and cafeterias, according to the working group's definitions.
8	17 363	Changes in the gradual reopening of commerce, excluding bars, restaurants and cafeterias, according to the working group's definitions.
12	17 377	Suspension of all non-essential activities due to the worsening of the COVID-19 situation in the city (e.g. a return to the scenario before the seventh week).

During the entire period of data collection, bars and restaurants were prohibited from opening for patrons; only delivery and takeaway services were allowed.

flavour, taste, aroma; descriptions of the benefits of using/consuming the product[27,28]. We considered adaptations of these strategies by the OFD platforms in our data collection, and we investigated the use of photos, discounts, 'combo deals' (combinations of food items and drinks offered at a discount), and messages on healthiness, value for the money, tastiness, and pleasure (Table 3).

Table 2 Description of the food groups advertised on the OFD platform

Food group		Description
Predominantly healthy	Water	Natural bottled water, either still or sparkling.
	Natural juices and smoothies	Fruit or vegetable juices and smoothies – for example, orange juice and cabbage–pineapple–ginger juice.
	Vegetables	Dishes made predominantly with vegetables – for example, salad and vegetable broth.
	Fruits	Whole fruits or dishes made predominantly with fruits – for example, apple, banana and fruit salad
	Traditional meals and pasta	Dishes made predominantly with unprocessed or minimally processed foods, pasta and international cuisine (except Oriental) – for example, rice, beans, meat and vegetables, lasagne, and paella.
Predominantly unhealthy	Ultra-processed beverages	Soft drinks, ultra-processed juices, energy drinks, tonic water and flavoured water.
	Ice cream, candies, and salty packaged snacks	Ice cream, popsicles, candies, chewing gum, sweets, and chocolates, and salty packaged snacks such as chips.
	Sandwiches	Items having bread and other ultra-processed foods – for example, hamburger and hot dog.
	Savoury snacks	Fried and baked snacks – for example, croquette.
	Pizza	Pizzas made predominantly with ultra-processed ingredients, for example, ham pizzas.

OFD, online food delivery.

Table 3 Marketing strategies used on the OFD platform to persuade users to buy food items

Strategy		Example	Description
Power of advertising	Photos	In -duplo bacon+ porção de batata 120 gramas + refrigerante lata 350 ml. Big pão. 150g de pura carne bovina coberta com queijo cheddar derretido, bacon em dobro .cebola carameliza- da. Molho especial, alface e tomate.+ batata 120 gramas + refrigerante escolha seu refri	Offer illustrating a food item (here, a burger).
Premium offers	Discounts	Pizza personal chocolate. Pizza 20 cm 4 fatias chocolate com nozes. R$ 20,00 R$ 25,00	Offer informing a reduction in the price of a food item (here, chocolate pizza, from R$25 to R$20).
	Combos	Combo 02. Esse combo contém: 02 x hambúrgueres, 2 x porções batata tradicional 60g (cada) e 2 x refrigerantes. (faça as escolhas nos complementos)	Offer of a combination of food items (here, burger, fries and soda) at a price lower than the sum of the prices of the individual items.

Table 3 *Continued*

Strategy	Example		Description
Claims	Message on healthiness	**Sm fitness Grande** Monte sua marmitex fitness e saudável.	Offer inviting the consumer to create a healthy and nutritious meal.
	Message on value for the money	**2 por 1: massa tradizionale** Monte seu prato e ganhe outro igualzinho!	Offer of two food items for the price of one.
	Message on tastiness and pleasure	**Salada caesar mr folhas** Alface americana fresquinha, lascas de queijo parmesão, delicioso frango desfiado, generosa porção de crouton caseiro e um saboroso molho caesar caseiro.	Offer listing the ingredients of a Caesar salad and using adjectives such as delicious, fresh, and tasty.

OFD, online food delivery.

Data analysis

We double-coded all the food items in a spreadsheet through two independent assessments. The coding was checked for agreement, and all divergences were resolved by a third researcher.

Data analysis was performed using the Stata software, version 12.0 (StataCorp LLC). We conducted descriptive statistics to describe how much each food group featured in the offers (%) and the marketing strategies employed on the OFD platform during the study period. Analysis stratified by mealtime and day of the week was also applied, and the results are presented in the supplementary material.

Results

In general, the OFD platform most commonly promoted traditional meals and pasta, ultra-processed beverages, and sandwiches – these food groups were offered 20–25 % of the time during the 16 weeks (Fig. 2(a), (b) and

(c)). Pizza was also frequently offered (10–15 %) on the platform. Sandwiches, pizza and traditional meals offers varied the most during the study period, although we did not identify any clear pattern (Fig. 2(a)).

Also, there were no promotions for water during the whole period, and those featuring natural juices and smoothies, vegetables, and fruits were least common (<5 %) (Fig. 2(b) and (c)).

During the study period, the most common marketing food promotion strategies on the OFD platform were photos (> 80 %) and discounts (> 95 %), and approximately 30 % featured combos (Fig. 3(a)). The platform promoted foods' value for the money and messages on tastiness and pleasure more often than the healthiness of the foods (Fig. 3(b)).

During the study period, offers of traditional meals and pasta led during the lunch hours (24–46·9 %). During the dinner hours, ultra-processed beverages (18·4–32 %) and sandwiches (18–40 %) were the most common food items promoted. Regardless of the time, the least common offers
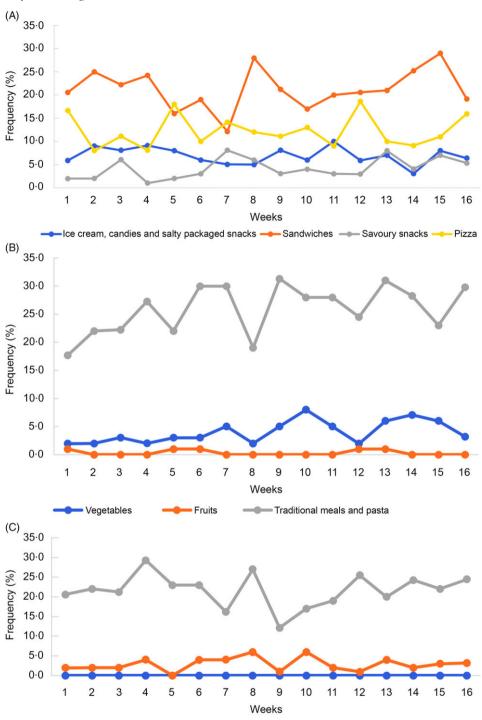
Fig. 2 Characterisation of the food groups promoted on an online food delivery platform during the COVID-19 pandemic in Belo Horizonte

were for water, natural juices and smoothies, vegetables, and fruits. We found no significant differences between the weekday and weekends food offers. In both periods, the most promoted food items were traditional meals and pasta, ultra-processed beverages, and sandwiches.

We also found no significant differences in the marketing strategies used during the different mealtimes or days of the week and significant variations in the behaviour of the variables during the study period (Supplementary material).
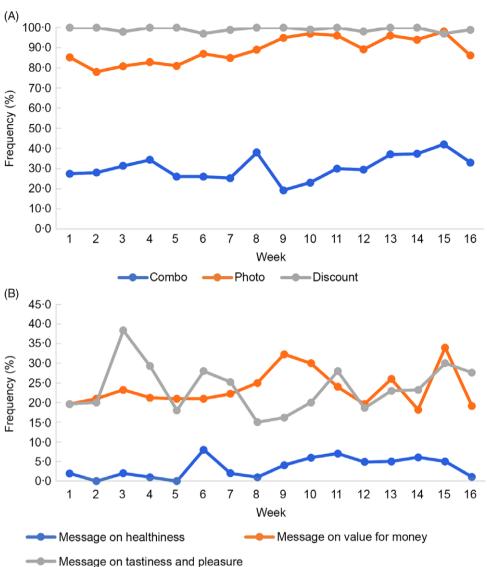
Fig. 3 Food promotion marketing strategies on an online food delivery platform during the COVID-19 pandemic in Belo Horizonte

Discussion

This study revealed that during the 16 weeks of the COVID-19 pandemic in a Brazilian metropolis, except for traditional meals and pasta, the promotions on the OFD platform primarily featured unhealthy foods and beverages. The app promoted sandwiches, pizza and ultra-processed beverages more frequently than water, natural juices and smoothies, vegetables, and fruits. The most frequently used typical marketing strategies to persuade consumers to buy the food items were photos, discounts and claims about tastiness, pleasure and value for the money.

As previously mentioned, a study characterised food advertising on OFD platforms in 27 Brazilian cities[20]. Our results aligned with that study's finding that the main foods promoted on Brazil's OFD platforms were traditional meals and pasta, bread-based items (like burgers),

pizza and ultra-processed beverages; moreover, the marketing strategies identified by the two studies were also similar[20]. However, our investigation went further by adding information about the longitudinal pattern of food advertising on OFD platforms in Brazil during the pandemic.

Although any foods available on the OFD menus could be promoted with discounts, combo deals or other incentivising methods, the OFD platform chose specific food types from the menus for incentive promotions. We found that except for traditional meals and pasta dishes made with fresh and minimally processed foods such as rice, beans, meat and vegetables, the OFD platforms chose to promote predominantly unhealthy foods.

Internationally, other studies have found similar results, suggesting that the OFD platform environment does not promote healthiness. In Canada, the quality of food on offer in the menus of twelve restaurants on four popular OFD

platforms was considered poor (HEI-2015 score ranged from 19·95 to 50·78 out of 100)[9]. In Australia and New Zealand, the most popular food outlets registered on one OFD platform have been classified as 'unhealthy', with 85·9 % of all popular menu items being discretionary[10]. In addition, a study has compared OFD meal options in three cities of high-income countries and found burger, pizza and Italian food items in the top ten most common meals on the app[11].

OFD platforms use various marketing strategies to enhance user experiences and increase food purchase intentions. If the experience is good, it will stimulate consumers to use the app whenever they desire a satisfying meal[3]. Previous studies have shown that cost savings, convenience, varied choices, information availability, lack of social contact and customised goods or services are important factors influencing utilitarian value in online shopping[3,29]. Therefore, discounts (frequently applied in the form of coupons), message on economy and combos are strategies that offer the consumer savings in terms of both cost and time. In addition, hand-picking multiple food items for a combo can give the consumer the feeling that it has been made exclusively for him/her. Furthermore, the use of messages on tastiness and pleasure improves the sensory, imaginative and emotional experience while buying[3]. The use of photos is another strategy that offers consumers more sensory enjoyment and anticipates the experience they may have if they choose the illustrated meal.

Clever marketing strategies increase people's use of OFD platforms and, consequently, their consumption of the unhealthy foods featured by the apps. Eating poorly increases the likelihood of developing (or aggravating) chronic conditions, an important risk factor for severe COVID-19 symptoms[30]. Increased reliance on OFD platforms use can lead to over-ordering, resulting in overeating and food waste. The increased delivery traffic also means increased greenhouse gas emissions, which impact the global community and sustainability[31,32]. Thus, designing interventions or public policies aimed at improving OFD platforms from the perspective of people's health, and the conscious use of these apps are urgent.

Food outlets could provide consumers with information on the energy content of their dishes and drinks and rank their food according to nutritional profile models or other nutritional recommendations by health organisations; they could also increase the proportion of healthier items on their menus[7] and try different strategies to promote the consumption of fresh foods. Although many consumers are concerned about freshness, since the pandemic, buying fresh food items online is gradually becoming the norm worldwide; sellers use packaging that keeps food safe and fresh during transit and displays its freshness to reassure consumers[33].

Another way to promote healthy eating through OFD platforms is creating a digital interface that encourages or 'nudges' users towards healthier choices, for example, by setting healthy items as the default, restructuring the menu to highlight healthier options using methods such as promotional tagging or recommending a healthier alternative to a previously ordered meal[5]. OFD platforms could also provide filters that enable users to refine their searches according to specific nutrition-related criteria[7].

Nevertheless, numerous studies have identified the limitations of self-regulatory measures[34], suggesting that government regulation might also be needed. Few governments have established policies regulating food and beverage choices on OFD platforms. As of 2022, UK restaurant chains must display the calorie information of non-prepacked food and drink items prepared for immediate consumption, including menus on OFD platforms[14]. Other strategies for regulation include nutrition labelling for all food sold on the platforms and limiting the use of price promotions and combo deals on unhealthy foods, which are common food marketing tactics.

We also need to regulate the use of individual data to personalise food offers. OFD platforms can communicate directly with consumers through mobile phone or social media; based on what marketers know about them, some are offered rewards, discounts and tailored advertising messages – this affects their right to be protected from such practices[35]. Until recently, Brazil did not have an appropriate legislation to regulate data privacy on the Internet, and many doubts about its applicability remain[36]. In accordance with Muangmee et al.[37], users' security in terms of sensitive data must be protected on OFD platforms, just as doors, windows and walls serve as barriers to intrusion in the physical restaurant setting. Therefore, we consider it important to protect sociodemographic information and data about user navigation on multiple devices to prevent OFD platforms from sending tailored messages that encourage unhealthy eating.

Discussions on the future of OFD platforms should also include examining the digital food environment in a post-pandemic world. The pandemic accelerated transformations in the food retail industry, with virtual points of purchase making both healthy and unhealthy foods more accessible and convenient[35]. We identified opportunities for improving the healthiness of Brazil's OFD platforms. However, equitable access to these services must be guaranteed for all social groups. The expansion of digital food retail services has spotlighted the digital divide: OFDs provide improved food access to people living in wealthy, well-connected neighbourhoods but limited options for people with fewer resources and those living in less centralised areas[35,38]. Future investigations should address the gaps in OFD platform access in Brazil. Also, future studies could provide information about how individuals respond to food offers on OFD platforms and the consequences of this exposure on their health.

Finally, our results study's limitations need to be addressed. We studied only the foods advertised on the app's home page; users encounter other options when they

access the restaurant's full menu and the OFD platform's social media pages. Furthermore, we studied only one platform. In addition, although longitudinal, during the entire study period, food outlets remained shut, and we could not evaluate how the digital food environment changed after restaurants and bars reopened for patrons. However, these aspects notwithstanding, for the first time, a longitudinal study described food promotions on OFD platforms, especially during the COVID-19 pandemic when people have been more exposed to the digital environment and vulnerable to unhealthy eating choices.

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Supplementary material

For supplementary material/s referred to in this article, please visit https://doi.org/10.1017/S1368980022000489

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