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ARTIGO

EXPANDING THE POLICY AGENDA FOR HEALTHY FOOD CONSUMPTION AFTER COVID-19

EXPANDINDO A AGENDA POLÍTICA PARA CONSUMO DE ALIMENTOS SAUDÁVEIS APÓS O COVID-19

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ABSTRACT

Our study aimed to expand the policy agenda for healthy food consumption considering the Brazilian context and the lessons learned from eating behavior and social norms during the COVID-19 pandemic. The authors used an electronic survey to identify food consumption patterns in Rio de Janeiro before and during the pandemic. We observed that women have higher self-perception of healthier eating habits than men since they believe they have a more balanced diet, especially in the poorest classes. This factor can be explained by a possible sexist behavior that associated a diet rich in fruits and vegetables with women's eating habits. In addition, during the pandemic, the poorest have more difficulty in buying fruits and vegetables than the richest had. We also found that the wealthier classes usually waste more food than the poorest. Besides, more than 50% of our respondents declared that they had gained weight during the pandemic.
Keywords: eating behavior; food waste; lockdown; COVID-19; Brazil.

RESUMO

Este estudo visa expandir a agenda política para o consumo de alimentos saudáveis considerando a realidade brasileira e as lições aprendidas durante a pandemia de COVID-19. Os autores usaram uma pesquisa eletrônica para identificar padrões de consumo alimentar no Rio de Janeiro antes e durante a pandemia. Observamos que as mulheres declaram ter hábitos alimentares mais saudáveis do que os homens, principalmente nas classes mais pobres. Esse fator pode ser explicado por um

comportamento machista que costuma associar uma dieta rica em frutas e hortaliças a hábitos alimentares femininos. Ademais, durante a pandemia os mais pobres tiveram mais dificuldade em comprar frutas e verduras do que os mais ricos. Também observamos que as classes mais ricas costumam desperdiçar mais comida do que as mais pobres. Além disso, mais de 50% dos nossos entrevistados declararam ter ganhado de peso durante a pandemia.
Palavras-chave: hábitos alimentares, desperdício alimentar, isolamento, COVID-19, Brasil.

1 INTRODUCTION

In 2019, the number of people living with hunger in Latin America and the Caribbean was 47 million, while more than 190 million people faced moderate or severe food insecurity (FAO, 2020). In times of pandemic, the trend is that the situation gets even worse since many families had reduced income during this period. For example, of 909 households surveyed in two slums in São Paulo, more than 50% reported moderate or severe food insecurity in the first half of 2020. These people reported not having enough money to eat healthy and nutritious food (Manfrinato *et al*., 2021).

In this context, considering the food insecurity exacerbated by COVID-19, and given that the literature on the food environment and food acquisition patterns in Latin America is still scarce (Cequea *et al*., 2021), this study aims to expand the agenda for healthy food consumption considering the Brazilian reality and the lessons learned from the COVID-19 pandemic. The study population involved residents of Rio de Janeiro state, one of the largest metropolitan areas of Brazil (Lucena *et al*., 2021).

2 METHODS

The authors conducted an electronic survey to identify food consumption patterns in Rio de Janeiro before and during the pandemic. The survey was approved by the Brazilian National Commission on Ethics in Research (CONEP) of the Neurology Institute Deolindo Couto of the Federal University of Rio de Janeiro / INDC – UFRJ (Brazil). E-survey enables access to respondents quickly.

The link to answer the survey was disseminated through various communication channels, including social media, email, and specific scientific dissemination groups. The participants were selected based on their accessibility and/or proximity to the researchers

(Jager; Putnick; Bornstein, 2017). The questionnaire was formulated based on previous researches about Brazilian food habits and effects of COVID-19 in food security (Casotti, 2002; Hassen; Bilali; Allahyari, 2020; Jribi *et al*., 2020). The questionnaire was administered in the Portuguese language from July 02 until August 31, 2021 using online forms.

2.1 Statistical analysis

We applied the following statistical tests using Jamovi 2.2.5 and statistical significance was assessed at the 0.05 level (Şahin; Aybek, 2019):

- Qui-square was applied when the variables were qualitative nominal. Then, the residuals were calculated to investigate further the source of a statistically significant result.

- For non-paired ordinal variables, we applied one-way analysis of variance or Kruskal–Wali's tests. Then, Dwass-Steel-Critchlow-Fligner pairwise comparisons were used for Post-hoc multiple comparisons.

- Wilcoxon Test was applied for paired ordinal data.

3 SURVEY

3.1 Demographic characteristics

Table 1 shows the sociodemographic data of the respondents of this study. Most of the respondents have completed graduation (61.3%, n =264). The convenience sample can justify the high education level of the respondents.

Table 1 - Sociodemographic characteristics of the participants (n=431) (**continua**)

Characteristics		**% of respondents**
Gender	Male	43,4%
	Female	56,6%
Age (years)	< 18	0,7%
	18-25	25,8%
	26-40	49,9%
	41-60	17,6%
	> 60	6,0%

City	Rio de Janeiro	68,7%
	Belford Roxo	6,5%
	Niterói	4,9%
	São Gonçalo	3,2%
	Nova Iguaçu	2,8%
	Others	13,9%
Number of persons in the household	1	11,1%
	2	27,1%
	3	30,9%
	4	24,1%
	≥ 5	6,7%
Level of education	Incomplete Elementary School	0,5%
	Completed Elementary School	0,2%
	Incomplete secondary education	1,4%
	Completed secondary education	3,5%
	Incomplete university degree	33,2%
	University degree	61,3%
Occupation	Do not perform a paid activity	11,6%
	Student	19,5%
	Informal worker	6,0%
	Employed	51,7%
	Manager or trader	7,9%
	Retired	3,2%
Household income	Less than 2 minimum wages	10,9%
	Between 2 and 4 minimum wages	22,7%
	Between 4 and 10 minimum wages	35,3%
	Between 10 and 20 minimum wages	21,6%
	Above 20 minimum wages	9,5%

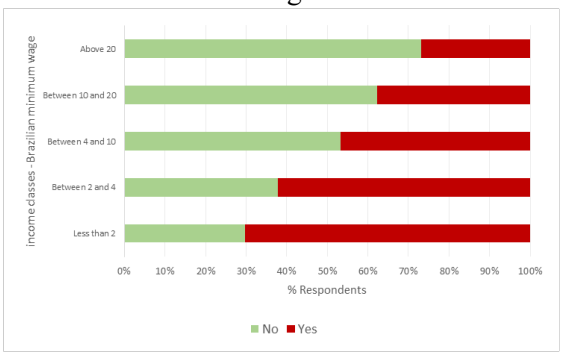
Source: Authors' elaboration (2024).

3.2 Purchasing and consumption behaviors

We found evidence of a statistically significant difference between income levels. Figure 1 highlights that most of the poorest classes had difficulty buying fruits and vegetables, while the richest did not. Besides, we observed that women have higher self-perception of healthier eating habits than men do since they believe to have a more balanced diet, especially in the poorest classes (Figure 2). Women declared eating more fruits and vegetables than men do (Figure 3).

Figure 1 - A) Percent of respondents with difficulty in buying fruits and vegetables during the pandemic by income class and B) adjusted standardized residual analysis. The significant residuals are marked in marked cells.

A)

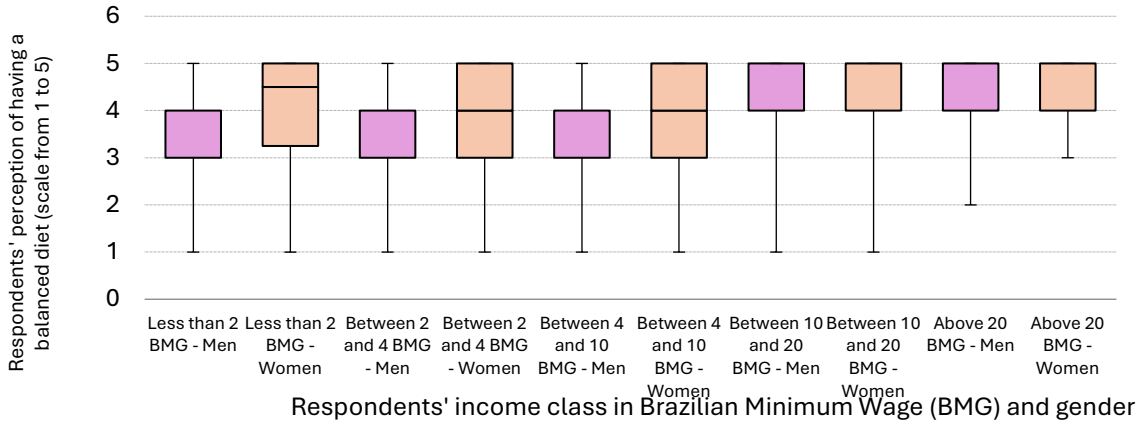


B)

	No	Yes
Less than 2	-3,09	3,09
Between 2 and 4	-2,99	2,99
Between 4 and 10	0,69	-0,69
Between 10 and 20	2,47	-2,47
Above 20	2,98	-2,98

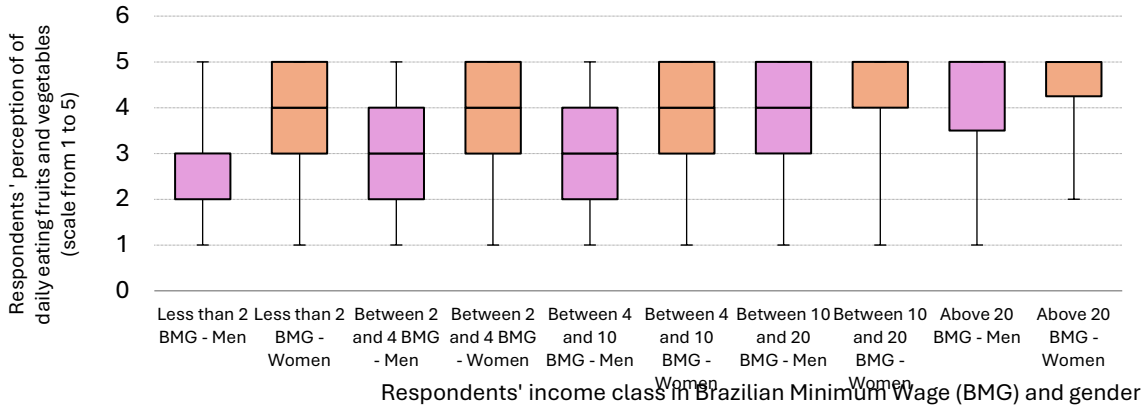
Source: Authors' elaboration (2024).

Figure 2 - Respondents' self-perception of having a balanced diet grouped by income class and gender. Scale from 1 ("I totally disagree. My diet is not balanced at all") to 5 ("I totally agree").



Source: Authors' elaboration (2024).

Figure 3 - Respondents' self-perception of daily eating fruits and vegetables grouped by income class and gender. Scale from 1 ("I totally disagree" to 5 ("I totally agree").

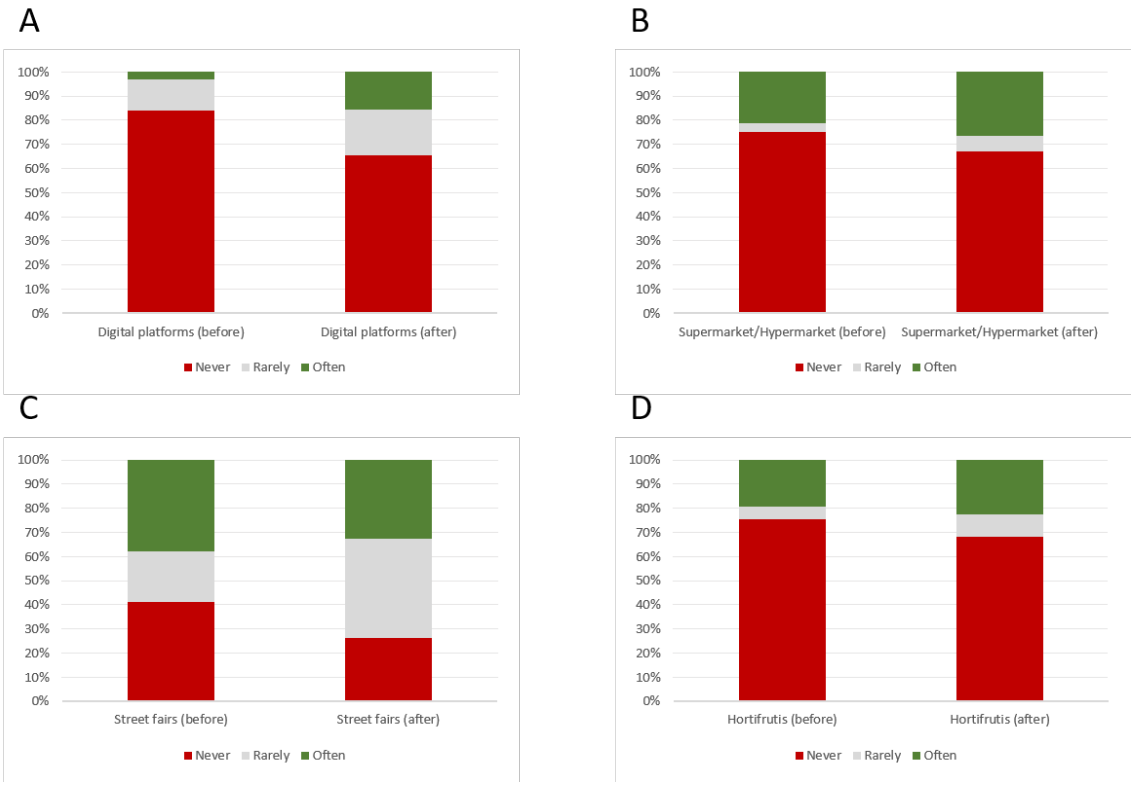


Source: Authors' elaboration (2024).

The changes in food shopping channels were investigated in Figure 4. Results showed a decrease in the number of respondents that never used digital platforms (Figure

4A), we also observed a decrease in the number of respondents that used street fairs during the pandemic (Figure 4C).

Figure 4 - Food shopping channels before and during the COVID-19 pandemic

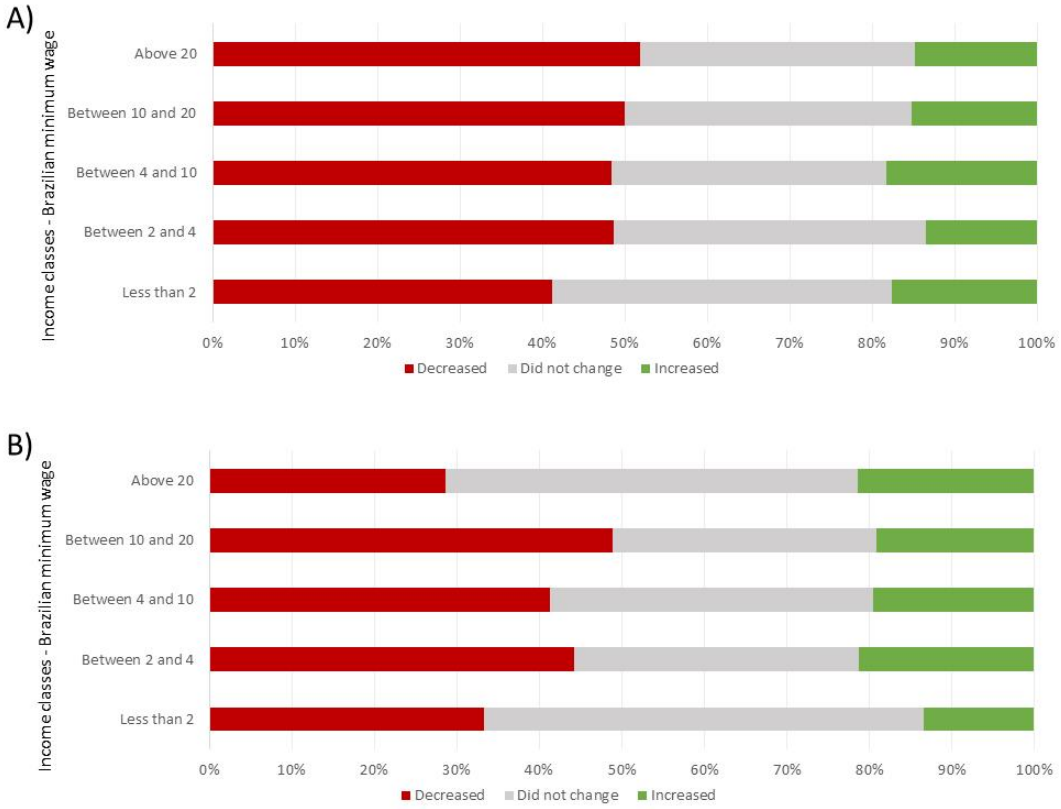


Source: Authors' elaboration (2024).

3.3 Physical health

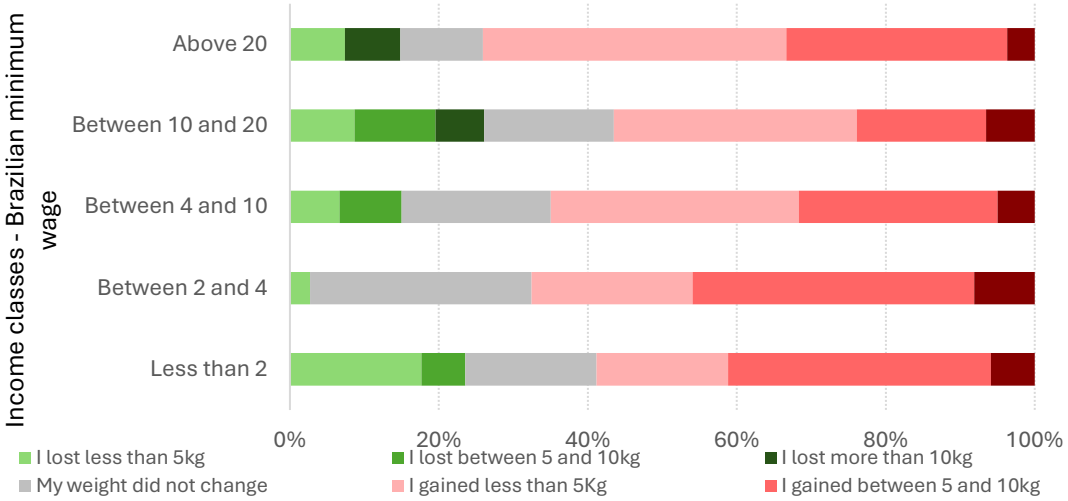
As we can observe in Figure 5, during the pandemic, there was a tendency to reduce physical activity. During the same period, as we can see in Figures 6 and 7, most respondents reported weighing gain.

Figure 5 - The exercise practice during social isolation by income class for (A) Men and (B) Women



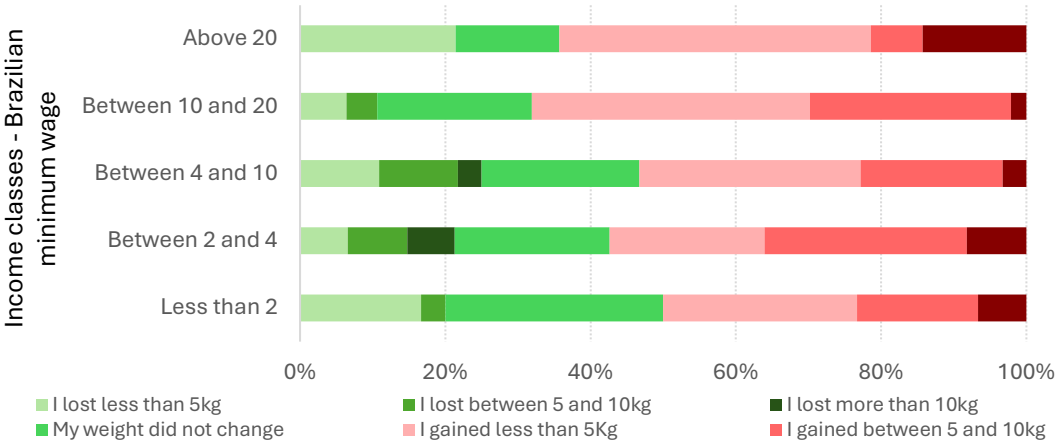
Source: Authors' elaboration (2024)

Figure 6 - Men's weight change during the pandemic by income class



Source: Authors' elaboration (2024).

Figure 7 - Women's weight change during the pandemic by income class



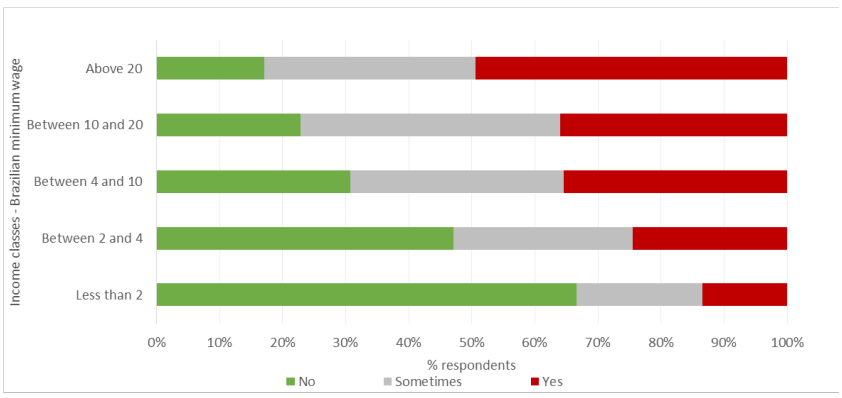
Source: Authors' elaboration (2024).

3.4 Food wast

The residuals analysis (Figure 8B) highlights that most of the poorest classes declared not buy more food than eat, while the richest have greater food waste propensity (Figure 8A). We identified that the income class receiving less than two minimum wages made smaller purchases during the pandemic (Figure 9B), while the income class between 2 and 4 wages did not change the purchasing volume (Figure 9A).

Figure 8 - Respondents' answers to the question: "Do you usually buy more food than eat?". A) Percent of respondents by income class and B) adjusted standardized residual analysis. The significant residuals are in marked cells.

A)



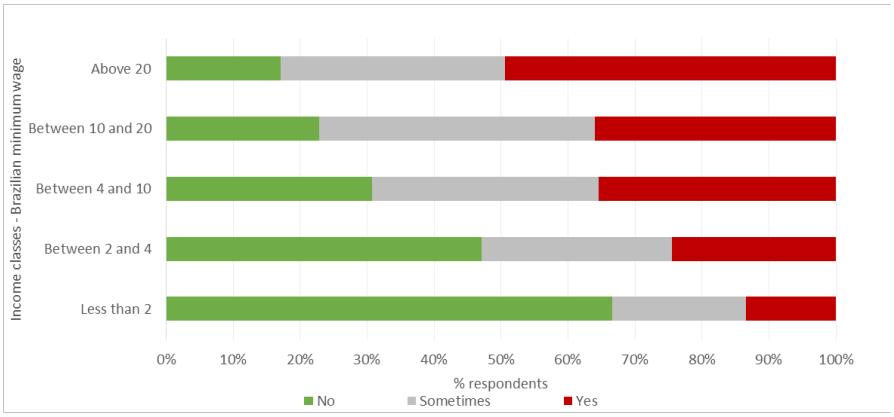
B)

	No	Sometimes	Yes
Above 20	-2,72	1,12	2,39
Between 10 and 20	-2,99	2,59	0,87
Between 4 and 10	-0,82	0,43	0,61
Between 2 and 4	2,90	-1,88	-1,67
Less than 2	3,86	-2,60	-2,10

Source: Authors' elaboration (2024).

Figure 9 - Respondents' answers to the question: "Was there a change in purchases at your home during the pandemic?". A) Percent of respondents by income class and B) adjusted standardized residual analysis. The significant residuals are in marked cells.

A)



B)

	No	Sometimes	Yes
Above 20	- 2,72	1,12	2,39
Between 10 and 20	- 2,99	2,59	0,87
Between 4 and 10	- 0,82	0,43	0,61
Between 2 and 4	2,90	- 1,88	- 1,67
Less than 2	3,86	- 2,60	- 2,10

Source: Authors' elaboration (2024)

4 DISCUSSION

4.1 Purchasing and consumption behaviors

The results on healthy eating habits show that, in general, women reported healthier diets than men (Figure 2). We also observed that women reported eating more fruits and vegetables than men (Figure 3). According to our survey, this difference between men's and women's diets is greater in the lower income classes. These gender inequalities were also found in Barros et al. (2016), and suggest that healthier eating habits are not an only economic phenomenon, but also cultural (Cunha et al., 2011). According to Sobal (2005), some men still associate a diet rich in fruits and vegetables with a feminine habit, while eating meat brings a more masculine image.

Additionally, we found evidence that the poorest had more difficulty in buying fruits and vegetables during the pandemic. This situation requires particular attention since according to ECLAC (2020) the number of people living in poverty in Brazil was expected to rise from about 19.4% in 2019 to 25.4% in 2020, while the forecasted number of living in extreme poverty from about 5.4% in 2019 to 7.9% in 2020.

Besides, results showed a decrease in the number of respondents that never used digital platforms (Figure 4A). Regarding food delivery apps, social contact restrictions may have stimulated the capturing of new clients (Kumar; Shah, 2021). In Brazil, unhealthy meals (e.g., ultra-processed beverages and pizza) dominated food delivery platforms and were usually cheaper than healthier options (e.g., natural juices and sandwiches) (Horta; Matos; Mendes, 2021). Therefore, the growth of food delivery apps may stimulate unhealthy eating habits if the marketing strategies did not change.

We also observed a decrease in the number of respondents who used street markets during the pandemic (Figure 4C). Our results are consistent with a survey conducted by Embrapa in May 2020, which found that before the pandemic, 21% of Brazilians usually bought vegetables and fruits from street markets, and after the pandemic, this number changed to 11% (Nascimento; Carvalho; Siqueira, 2020). In addition, fresh food is usually cheaper at street markets than in supermarkets because the supply chain is shorter, encouraging direct contact between producer and consumer. This may justify the common complaint of rising prices among the poorest (PREISS, 2020). Furthermore, pricing strategies adopted by supermarkets usually encourage ultra-processed foods instead of fresh food (Machado *et al*., 2018). In Brazil, the high consumption of ultra-processed foods is associated with high consumption of free sugars, and total, saturated and trans fats (Louzada *et al*., 2018).

4.2 Physical health

As we can observe in Figure 5, during the pandemic, there was a tendency to reduce physical activity. Werneck *et al*. (2021) argue that the quarantine measures have stimulated the reduction of physical activity and the increase in sedentary behavior, such as increased hours watching TV. Guimarães *et al*. (2020) highlight that approximately 14% of Brazilian advertisements on free-to-air TV channels were food-related, with over 90% promoting ultra-processed foods, thereby encouraging poor dietary habits.

During the same period, as we can see in Figures 6 and 7, most respondents reported weight gain. The high consumption of sugar and soft drinks is associated with obesity, especially in women (Lobato; Costa; Sichieri, 2009). In 2019, almost 60% of the habitants of Rio de Janeiro were overweight and about 20% were obese (BRASIL, 2020). The gain of weight and reduction of physical activities may also be a warning signs for

possible mental disorders, such as depression. Poor diet habits could be an escape route for bad feelings, which can be extremely dangerous (Werneck *et al*., 2020). According to Mazzolani et al. (2021), bad psychological symptoms were associated with food choices, possibly including eating in front of the TV, replacing main meals by snacks.

4.3 Food waste

As pointed out by Falasconi *et al*. (2019), although most food waste is generated in households, the perceived quantity of food waste by consumers tends to be underestimated. One of the reasons is that people usually see as food waste only what they consider edible, excluding parts that they normally do not eat and could be eaten, such as plant stems (Aschemann-Witzel; de Hooge; Almli, 2021).

The chi-square test identified a significant difference between income classes considering the habit of "usually buying more food than eating" (Figure 9). The same was observed in a survey in Uruguay (Aschemann-Witzel; Giménez; Ares, 2019). These findings are also in line with Falasconi *et al*. (2019), which argue that food waste concerns are more associated with the perception of food waste as a "waste of money" than with social and environmental awareness. For example, people hardly waste expensive items, such as fish and meat, and they usually waste fruit, vegetables, and bread (Aydin; Yildirim, 2021). In addition, according to Aschemann-Witzel *et al*. (2018), food waste increases with the level of a country's income, because the relative importance of the food budget is lower compared with the income.

4.4 Implications for practice

Based on our literature review and our survey, we propose a policy agenda with recommended directions for public policies to deal with food security and food demand. These are the seven key policy actions composing our proposed agenda:

1. During the COVID-19 lockdown, exercise practice decreased in all income levels (Figure 5). Additionally, most of the survey respondents gained weight (Figures 6 and 7). Thus, we suggest policy interventions encouraging healthy eating habits and physical activities, such as sugar taxes in sweetened beverages and junk food.

Besides, subsidies to reduce the price of healthier options (e.g. fresh food, organic food) and taxes on high-calorie, low-nutrition food options.

2. Given that childhood is a critical period to establish lifelong eating habits, the policies aimed at limiting the marketing of children's unhealthy food should be encouraged, along with the design of school meals based on high-quality dietary standards.

3. Figures 2 and 3 suggest that budget constraint is not the only factor impacting healthy food consumption. For the same income class, women usually eat more fruits and vegetables than men, especially at low-income levels. These results suggest a possible cultural factor that needs to be worked on through awareness campaigns to demystify any cultural resistance to healthier eating. Thus, we suggest make people aware of the importance of a healthy diet through awareness campaigns.

4. Physical inactivity and obesity are factors scientifically associated with an increased risk of diseases. Therefore, more campaigns are needed to publicize the link between poor eating habits and increased risk of developing cancer, cardiovascular disease, and diabetes. We also highlight the positive effects of a balanced diet in the reinforcement of the immune system.

5. In our research, 70% of the poorest people complained about rising fruit and vegetable prices. In view of that, we suggest cooking campaigns on social media and mobile applications to help families prepare affordable and healthy meals at home. Besides, a subsidy policy to improve the access of low-income people to fruits and vegetables can minimize the price restriction.

6. Campaigns teaching people how to store and get the most of all parts of food are needed. In Brazil, household food waste accounts for more than 12 million tons per year (Pnuma, 2021) and avoidance of leftovers is already in the top five main categories of food waste of lower-income families (Porpino; Parente; Wansink, 2015).

7. Besides, we recommend a national program to reduce food waste, especially at the household level.

We also highlighted some market opportunities to promote healthier habits:

I. Regarding business management in the food market, we highlight the great opportunity for healthy food apps, since most food apps in Brazil are associated with unhealthy foods. Apps combing meal planners, shopping lists, and simple recipes can help to improve people healthy and decrease food waste.

II. Short food supply chains, with direct contact between farmers and consumers, could improve market resilience to pandemics and reduce food costs.

5 CONCLUSION

This study aimed to expand the policy agenda for healthy food consumption, taking into account the Brazilian context and the lessons learned from the COVID-19 pandemic. The results showed that the poorest people in Brazil had more difficulties in buying fruits and vegetables due to rising prices and they wasted much less food than the richest, suggesting that food waste is more related to the perception of food waste as a "waste of money" than to socio-environmental awareness. Fresh food is usually cheaper to buy than in supermarkets because it encourages direct contact between producer and consumer, which may justify the complaints about rising prices. We also observed that women consume more fruits and vegetables than men, especially in the poorest classes. This factor can be explained by a possible sexist behavior in the low-income classes, which associates a diet rich in fruits and vegetables with women's eating habits. In addition, the increased time spent at home stimulated the acquisition of new clients for food delivery apps. It is worth noting that unhealthy options predominated in these apps. We also found increased consumption of candy, cookies, and unhealthy snacks, a decrease in physical activity and weight gain during the pandemic. Furthermore, we propose a policy agenda with recommended directions for public policies to deal with food security and food demand. This study could also serve as a baseline for decision-makers in food insecurity situations aggravated by pandemic outbreaks.

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