Received: 13 January 2021 | Accepted: 25 March 2021

DOI: 10.1111/jhn.12901

Journal of Human Nutrition and Dietetics

COVID-19

Eating habits of children and adolescents during the COVID-19 pandemic: The impact of social isolation

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Abstract

Background: The social isolation enforced as a result of the new coronavirus (COVID-19) pandemic may impact families' lifestyle and eating habits. The present study aimed to assess the behaviour and dietary patterns of Brazilian children and adolescents during the social isolation imposed by the COVID-19 pandemic.

Methods: The present study was conducted using an online, anonymous cross-sectional survey with 589 children and 720 adolescents from Brazil during a nation-wide social isolation policy. The Mann–Whitney *U*-test or the Kruskal–Wallis with the Dunn post-hoc method and a radar chart were used to compare the weekly consumption of each food by age group and isolation status. $p < 0.05$ was considered statistically significant. Analyses were conducted using R statistical software, version 4.0.2 (R Foundation for Statisitical Computing).

Results: We found that isolated families showed breakfast eating habits and the consumption of raw salad, vegetables, beans and soft drinks. Lower-class isolated families and those from the Northeast region consumed fruits, juices, vegetables and beans less frequently. Compared to children, adolescents were less isolated ($p = 0.016$), less active ($p < 0.001$), exposed to longer screen time ($p < 0.001$), showed an inadequate sleeping pattern ($p = 0.002$) and were from lower-class families ($p < 0.001$).

Conclusions: Social isolation affected the eating habits of children and adolescents. Non-isolated families presented a lower consumption of healthy food, especially those among the lower class, from Northeast Brazil, as well as adolescents.

KEYWORDS
adolescents, children, food habits, socio-economic indicators, lifestyle

Key points

1. The present study evaluated the behavior and eating patterns of Brazilian children and adolescents during the COVID-19 pandemic.
2. Non-isolated families have lower consumption of healthy foods, especially those of lower class, when compared to isolated families.
3. The adolescents were more physically inactive, exposed to a longer screen time and had a more inadequate sleep pattern.
4. These results are associated with unfavorable health outcomes.

INTRODUCTION

The coronavirus disease 2019 (COVID-19) was first identified in Wuhan, China, in December 2019. Subsequently, it has affected hundreds of thousands of people worldwide. The disease is caused by SARS-CoV-2, a new coronavirus strain that has not been previously identified in humans.[1] To prevent the spread of the disease, health authorities have enforced social isolation, which has changed the lifestyle of the population.[2]

As a form of socialisation and entertainment within the family environment, restrictions on daily activities may increase the time spent in front of television and interactive games.[3] Such habits affect sleep quality, besides influencing sedentary behaviours and maximising exposure to unhealthy food marketing by large companies, such as ultra-processed foods .[4–6] The low consumption of *in natura* or minimally processed foods and the excessive intake of ultra-processed foods have been associated with unfavourable health outcomes, such as high energy consumption with nutritional inadequacy, excess body weight, deterioration of insulin and lipid profiles, and decreased high-density lipoprotein-cholesterol levels and high triglyceride levels in different age groups, including in school-age children.[7–9]

Scarce financial resources, overloaded parents and/or caregivers with household tasks and homework, added to working from home, may impact the behaviour and dietary patterns of this population, leading to a greater search for ready-to-eat, fast-to-prepare and easily acceptable food.[10,11] At the same time, parental feeding practices can partially influence children's eating behaviours and weight status, which becomes important during a pandemic, when families spend more time together.[12] In addition, social isolation plays a key role in increasing families' stress levels,[13] favouring cases of hyperalimentation in response to negative emotions, such as sadness, anger, frustration, boredom, uncertainty about the future or the fear of contracting the disease.[14]

In this scenario, it is important for individuals to maintain a diversified, balanced dietary pattern, rich in antioxidant nutrients, including fruits and vegetables, aiming to strengthen the immune system.[15] The scientific recognition that healthy eating may positively impact the survival of patients infected with SARS-CoV-2 may also positively modulate food choices at this moment.[16]

Accordingly, the present study analysed the behaviour and dietary patterns of Brazilian children and adolescents during the new coronavirus pandemic.

METHODS

Population and study design

This is a cross-sectional study with a non-probabilistic sample consisting of parents and/or caregivers with child(ren) aged between 2 and 9 years old and adolescents. The survey was conducted using an online platform accessible from any device with an Internet connection, between 7 May 2020 and 12 June 2020. The study was approved by the National Research Ethics Commission (protocol 4.014.180) and all participants agreed to participate in the study by signing a digital informed consent form.

To investigate the eating habits and lifestyle behaviours of this population during the COVID-19 pandemic, two anonymous, structured self-completion questionnaires were created on the Google Forms platform (Google LLC, Menlo Park, CA, USA): the first directed to parents and/or caregivers of children between 2 and 9 years old, and the second to 10-18-year-old teenagers. Data on isolation status (working outside the home, self-isolation and close-contact isolation) and frequencies of outdoors activities were also collected. Families were considered isolated when all members were performing activities (academic, work-related or leisure) from home. Duplicate responses and data from children or adolescents outside the determined age range were excluded from the analysis.

Socio-economic evaluation

Sociodemographic analysis was performed based on gender, age, education level of the head of the household, and goods and services.[17] For data analysis, the economic classes were grouped into upper (A), middle (B1 and B2), and lower-middle and lower (C1, C2, D and E).

Food consumption evaluation

Dietary patterns were evaluated using a standardised questionnaire adapted from the National Adolescent School-based Health Survey (PeNSE).[18] PeNSE enables the comparison of international indicators, especially those of the Global School-based Student Health Survey,[19] developed by the World Health Organization and employed by over 90 countries worldwide.

Regarding frequency of consumption, respondents reported food groups or preparations consumed in the last 7 days during social isolation among the options: milk and dairy products; beans; vegetables (except amylaceous); raw salad, fresh fruits and fruit juices; French fries and/or fried snacks; hamburger and/or sausage; cookies, crackers and/or packaged salty snacks; sweets; soft drinks; and sugar-sweetened beverages and diet products. The first five were considered as healthy eating markers, and the last seven as unhealthy eating markers.

Each meal preparation and lunch and/or dinner substitution by snacks was measured based on the 7 days preceding the study. The habit of eating breakfast on ≥ 5 days of the week was considered as a healthy eating marker, and the habit of replacing lunch and/or dinner by snacks as an unhealthy eating marker.

Behaviour indicators

Regarding sleeping pattern, respondents reported their usual sleeping and waking hours, and the weekly average sleep was considered as the average sleep hours weighted during the week and the weekend.[20,21] Following the National Sleeping Foundation recommendations, an average < 8 h of sleep per night was deemed inadequate.[22,23]

Sedentary behaviour was assessed by the screen time per day (television, video games and computer) and classified as: (i) low screen time (< 2 h daily), (ii) high screen time (2–4 h) and very high screen time (≥ 4 h).[24,25]

Physical activity was assessed by the frequency and daily hours spent in exercises in the past week, including leisure activities. Participants were classified into three categories: (i) inactive (0 min day^{-1}); (ii) insufficiently active (> 0 and < 60 min day^{-1}); and (iii) active (≥ 60 min day^{-1}).[26]

Statistical analysis

Descriptive data are expressed in total counts and percentages (%) for categorical variables, and medians and interquartile ranges (IQR) for continuous variables. Pearson's chi-squared test was used to analyse the association of social isolation and age group (children and adolescents) with socio-demographic and behavioural indicators, as well as with each regular dietary pattern (≥ 5 days in the week). The Shapiro–Wilk test assessed the distribution for continuous variables, and none of them met the assumption of Gaussian distribution. Weekly frequency of consumption for each food, according to social isolation (intergroup comparisons) and age groups (intragroup comparisons), was compared by the Mann–Whitney *U*-test or the Kruskal–Wallis with the Dunn post-hoc method and considered appropriate. The median weekly frequency of consumption for each food was shown by a radar chart. $p < 0.05$ was considered statistically significant. Analyses were conducted using R, version 4.0.2 (R Foundation for Statistical Computing)[27] and Excel 2013 (Microsoft Corp.).

RESULTS

In total, 589 children and 720 adolescents from several Brazilian regions participated in the study. The median age of the children was 4 years old (IQR = 3.0–6.0 years) and the median age of the adolescents was 16 years (IQR = 14.0–17.0 years). Table 1 shows all of the socio-demographic variables and behaviour indicators of the study population according to social isolation.

Lower-class families, with adolescents, and from the North and Northeast regions were the least isolated ($p < 0.001$). Compared to children, adolescents were more physically inactive ($p = 0.02$), exposed to longer screen time ($p < 0.001$), showed a more inadequate sleeping pattern ($p = 0.002$) and came from lower-class families ($p < 0.001$).

Regarding participants' eating habits during the pandemic, breakfast was the only regular meal (> 5 times per week) that differed between isolated and non-isolated families ($p = 0.006$), and children showed a more regular consumption than adolescents ($p < 0.001$).

Children consumed all meals more regularly ($p < 0.001$) than adolescents, who often substituted large meals for snacks ($p < 0.001$) (Table 2).

Children in isolated families consumed more raw salad ($p = 0.039$), vegetables ($p < 0.001$), beans ($p = 0.025$), and fresh fruits and fruit juices ($p = 0.002$) compared to adolescents ($p < 0.001$). Regarding unhealthy eating makers, soft drinks were the only unhealthy product with a statistically significant difference, being consumed more frequently by non-isolated families ($p < 0.001$). Hamburgers, sweets, soft drinks and sugar-sweetened beverages were consumed more frequently by adolescents than children ($p < 0.001$) (Table 3).

Figure 1 shows the median weekly frequency of food consumption according to social isolation, Brazilian regions and socio-economic class. We verified a statistically significant difference in the weekly consumption of milk and dairy products, fresh fruits and fruit juices, and vegetables, with upper- and middle-class families, isolated ($p < 0.05$) or not ($p < 0.05$), consuming them more frequently. Soft drinks intake also differed, being more common among lower-class families, isolated ($p < 0.05$) or not ($p < 0.01$). The consumption of sweets solely differed among isolated families, being consumed more frequently by upper- and middle-classes ($p < 0.01$). When assessing food consumption according to Brazilian regions, we verified a statistically significant difference in the weekly consumption of milk and dairy products, beans, vegetables, raw salads, fresh fruits and fruit juices, and soft drinks ($p < 0.05$) for both isolated and non-isolated families. The north and northeast regions had the lowest median for healthy eating markers. Isolated families also presented a statistically significant difference for sweets and skimmed milk or light products ($p < 0.05$) among Brazilian regions.

DISCUSSION

The first cases of COVID-19 in Brazil were recorded in February 2020. Subsequently, the country has adopted social distancing measures to contain the spread of the virus,[28] which has affected the economy, health system, access to food and people's lifestyles.[2]

We consider this to be the first study on food consumption patterns of Brazilian children and adolescents during the social isolation enforced by the COVID-19 pandemic. At the same time, this is a pioneer analysis of whether or not social distancing recommendations have been adopted, in addition to their consequent influence on the behaviours and eating patterns of the population. Moreover, the continental

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TABLE 1 Frequency distribution of socio-demographic and behavioural indicators according to social isolation and age group, Brazil, 2020

	Socially isolated families			Non-isolated families		
	Total $N = 684$	Children $N = 330$	Adolescents $N = 354$	Total $N = 625$	Children $N = 259$	Adolescents $N = 366$
Brazilian region[a,b,c]						
North	22 (36.7)	6 (27.3)	16 (72.7)	38 (63.3)	9 (23.7)	29 (76.3)
Northeast	50 (47.2)	7 (14.0)	43 (86.0)	56 (52.8)	9 (16.1)	47 (83.9)
Central-West	41 (38.3)	14 (34.1)	27 (65.9)	66 (61.7)	22 (33.3)	44 (66.7)
Southeast	506 (56.5)	286 (56.5)	220 (43.5)	390 (43.5)	207 (53.1)	183 (46.9)
South	65 (46.4)	17 (26.2)	48 (73.8)	75 (53.6)	12 (16.0)	63 (84.0)
Socio-economic class[a,b,c]						
High	127 (53.6)	57 (44.9)	70 (55.1)	110 (46.4)	42 (38.2)	68 (61.8)
Medium	403 (55.2)	221 (54.8)	182 (45.2)	327 (44.8)	154 (47.1)	173 (52.9)
Low	154 (45.0)	52 (33.8)	102 (66.2)	188 (55.0)	63 (33.5)	125 (66.5)
Screen time (h day^{-1})[b,c]						
< 2	36 (59.0)	23 (63.9)	13 (36.1)	25 (41.0)	15 (60.0)	10 (40.0)
2–4	151 (56.6)	104 (68.9)	47 (31.1)	116 (43.4)	76 (65.5)	40 (34.5)
≥ 4	497 (50.7)	203 (40.8)	294 (59.2)	484 (49.3)	168 (34.7)	316 (65.3)
Hours of sleep[b,c]						
Inadequate	147 (47.6)	57 (38.8)	90 (61.2)	162 (52.4)	60 (37.0)	102 (63.0)
Adequate	411 (52.6)	215 (52.3)	196 (47.7)	370 (47.4)	167 (45.1)	203 (54.9)
Above adequate	126 (57.5)	58 (46.0)	68 (54.0)	93 (42.5)	32 (34.4)	61 (65.6)
Physical activity (min day^{-1})[b,c]						
Inactive (0)	279 (50.2)	96 (34.4)	183 (65.6)	277 (49.8)	66 (23.8)	211 (76.2)
Insufficiently (> 0 and < 60)	213 (54.9)	107 (50.2)	106 (49.8)	175 (45.1)	83 (47.4)	92 (52.6)
Active (≥ 60)	192 (52.6)	127 (66.1)	65 (33.9)	173 (47.4)	110 (63.6)	63 (36.4)

Values are expressed as total counts and percentage (n (%)). p-values were calculated by a chi-squared test. $p < 0.05$ was considered statistically significant.

[a]Significant associations when comparing socially isolated families vs. non-isolated families.

[b]Significant associations when comparing children vs. adolescents of socially isolated families.

[c]Significant associations when comparing children vs. adolescents of non-isolated families.

dimensions of Brazil and the distinct socio-economic characteristics of its regions highlight the relevance of our work, allowing other nations to take a strategic look at the impacts of the pandemic in the country.

Our results indicate that lower-class families were less likely to adhere to social isolation practices. Mobility restrictions imposed by the pandemic reduced the workforce across economic sectors from different countries, particularly threatening the jobs of underemployed individuals and those in more vulnerable conditions.[29] Low-income families also presented inadequate housing conditions, aggravated by the lack of access to drinking water, basic sanitation and adequate food. Such poor living conditions hinder their stay within these environments, which may explain the elevated rate of non-adherence to social isolation recommendations among this group.[30,31]

Conversely, isolation was more frequent among upper-income families, who were able to work from home. This scenario enabled these families to monitor and dedicate themselves to feeding their children, showing healthier dietary patterns. This hypothesis is reinforced by a survey reporting that 80% of parents feel they have formed stronger bonds with their families as a result of increased time together during confinement, despite the challenges imposed by performing both work and education activities at home.[32]

Our results show that breakfast was significantly more regular among both children and adolescents of isolated families. According to the literature, breakfast is an extremely important meal with respect to adjusting body weight and improving macro- and micronutrients intake, besides enhancing cognitive and academic performance. Even so, it is the meal that is most neglected by school-age children and adolescents.[33]

In the present study, approximately one-third of individuals replaced large meals with snacks, especially adolescents, isolated or not. We consider that the overload of household tasks and homework during the pandemic[34] may have influenced families to search for more practical foods and snacks.[35] The present study was not concerned with the quality of snacks consumed by individuals; however, when associated with

TABLE 2 Association between regular healthy and unhealthy routines (≥ 5 days week^{-1}) according to social isolation and age group

	Regular practice (≥ 5 days week^{-1})					
	Socially isolated families			Non-isolated families		
Dietary routines	Total *N* = 684	Children *N* = 330	Adolescents *N* = 354	Total *N* = 625	Children *N* = 259	Adolescents *N* = 366
Breakfast[a,b,c]	488 (71.3)	308 (93.3)	180 (50.8)	401 (64.2)	236 (91.1)	165 (45.1)
Morning snack[b,c]	201 (29.4)	146 (44.2)	55 (15.5)	185 (29.6)	131 (50.6)	54 (14.8)
Lunch[b,c]	587 (85.8)	326 (98.8)	261 (73.7)	546 (87.4)	257 (99.2)	289 (79.0)
Afternoon snack[b,c]	482 (70.5)	305 (92.4)	177 (50.0)	428 (68.5)	239 (92.3)	189 (51.6)
Dinner[b,c]	511 (74.7)	295 (89.4)	216 (61.0)	473 (75.7)	242 (93.4)	231 (63.1)
Evening snack[b,c]	246 (36.0)	142 (43.0)	104 (29.4)	217 (34.7)	125 (48.3)	92 (25.1)
Replacement of meals with snacks[b,c]	205 (30.0)	81 (24.5)	124 (35.0)	174 (27.8)	57 (22.0)	117 (32.0)

Values are expressed as total counts and percentage (n (%)). *p*-values were calculated by a chi-squared test. $p < 0.05$ was considered statistically significant.

[a]Significant associations when comparing socially isolated families vs. non-isolated families.

[b]Significant associations when comparing children vs. adolescents of socially isolated families.

[c]Significant associations when comparing children vs. adolescents of non-isolated families.

dRefers to those who replaced main meals more often than usual.

TABLE 3 Median weekly frequency of consumption of selected foods according to social isolation and age group.

	Socially isolated families			Non-isolated families		
Foods markers	Total *N* = 684	Children *N* = 330	Adolescents *N* = 354	Total *N* = 625	Children *N* = 259	Adolescents *N* = 366
Healthy eating markers						
Raw salad[a,c]	3.0 (0.0, 5.0)	3.0 (0.0, 5.0)	3.0 (1.0, 6.0)	3.0 (0.0, 5.0)	1.0 (0.0, 4.0)	3.0 (0.0, 5.0)
Vegetables[a,b,c,e]	4.0 (2.0, 7.0)	5.0 (3.0, 7.0)	4.0 (1.0, 6.0)	3.0 (1.0, 6.0)	4.0 (2.0, 7.0)	3.0 (1.0, 5.0)
Fresh fruits and fruit juices[a,b,c,d]	5.0 (2.0, 7.0)	7.0 (4.0, 7.0)	4.0 (1.0, 6.0)	4.0 (1.0, 7.0)	7.0 (2.0, 7.0)	3.0 (1.0, 6.0)
Beans[a,b,c]	5.0 (3.0, 7.0)	6.0 (4.0, 7.0)	5.0 (2.0, 7.0)	5.0 (2.0, 7.0)	6.0 (3.0, 7.0)	4.0 (2.0, 6.0)
Milk and dairy products[b,c]	7.0 (3.0, 7.0)	7.0 (5.0, 7.0)	6.0 (3.0, 7.0)	7.0 (3.0, 7.0)	7.0 (3.0, 7.0)	5.0 (2.0, 7.0)
Unhealthy eating markers						
Diet products[b,c]	0.0 (0.0, 0.0)	0.00 (0.0, 0.0)	0.0 (0.0, 0.0)	0.0 (0.0, 0.0)	0.0 (0.0, 0.0)	0.0 (0.0, 0.0)
French fries and/or fried snacks[b,c,d]	0.0 (0.0, 1.0)	0.0 (0.0, 1.0)	0.0 (0.0, 2.0)	0.0 (0.0, 2.0)	0.0 (0.0, 1.0)	1.0 (0.0, 2.0)
Hamburger and/or sausage[b,c]	0.0 (0.0, 1.0)	0.0 (0.0, 1.0)	1.0 (0.0, 2.0)	0.0 (0.0, 1.0)	0.0 (0.0, 1.0)	1.0 (0.0, 2.0)
Cookies, crackers, and packaged salty snacks[f]	2.0 (1.0, 5.0)	2.0 (1.0, 4.7)	2.0 (1.0, 5.0)	2.0 (0.0, 5.0)	2.0 (1.0, 5.0)	2.0 (1.0, 5.0)
Sweets[b,c,g]	2.0 (1.0, 4.2)	2.0 (1.0, 4.0)	3.0 (1.0, 5.0)	2.0 (1.0, 5.0)	2.0 (1.0, 3.0)	3.0 (1.0, 5.7)
Soft drinks[a,b,c]	0.0 (0.0, 2.0)	0.0 (0.0, 0.0)	1.0 (0.0, 3.0)	0.0 (0.0, 2.0)	0.0 (0.0, 1.0)	1.0 (0.0, 3.7)
Sugary drinks[b,c,h]	1.0 (0.0, 4.0)	0.0 (0.0, 2.0)	2.0 (0.0, 4.0)	1.0 (0.0, 3.0)	0.0 (0.0, 2.0)	2.0 (0.0, 5.0)

Values are expressed as the median (interquartile range). *p*-values were calculated by a Mann–Whitney *U*-test. $p < 0.05$ was considered statistically significant.

[a]Significant differences when comparing socially isolated families vs. non-isolated families.

[b]Significant differences when comparing children vs. adolescents of socially isolated families.

[c]Significant differences when comparing children vs. adolescents of non-isolated families.

[d]Excluding packaged-potato chips.

[e]Excluding potatoes and cassava (roots and tubers).

[f]Including packaged-potato chips.

[g]Sweets, candies, gum, lollipops, chocolates, etc.

[h]Juices, mate tea, natural guaraná, other teas, coffee, flavoured waters, sports drinks, and soy-based drinks, excluding milk and yogurt drinks.

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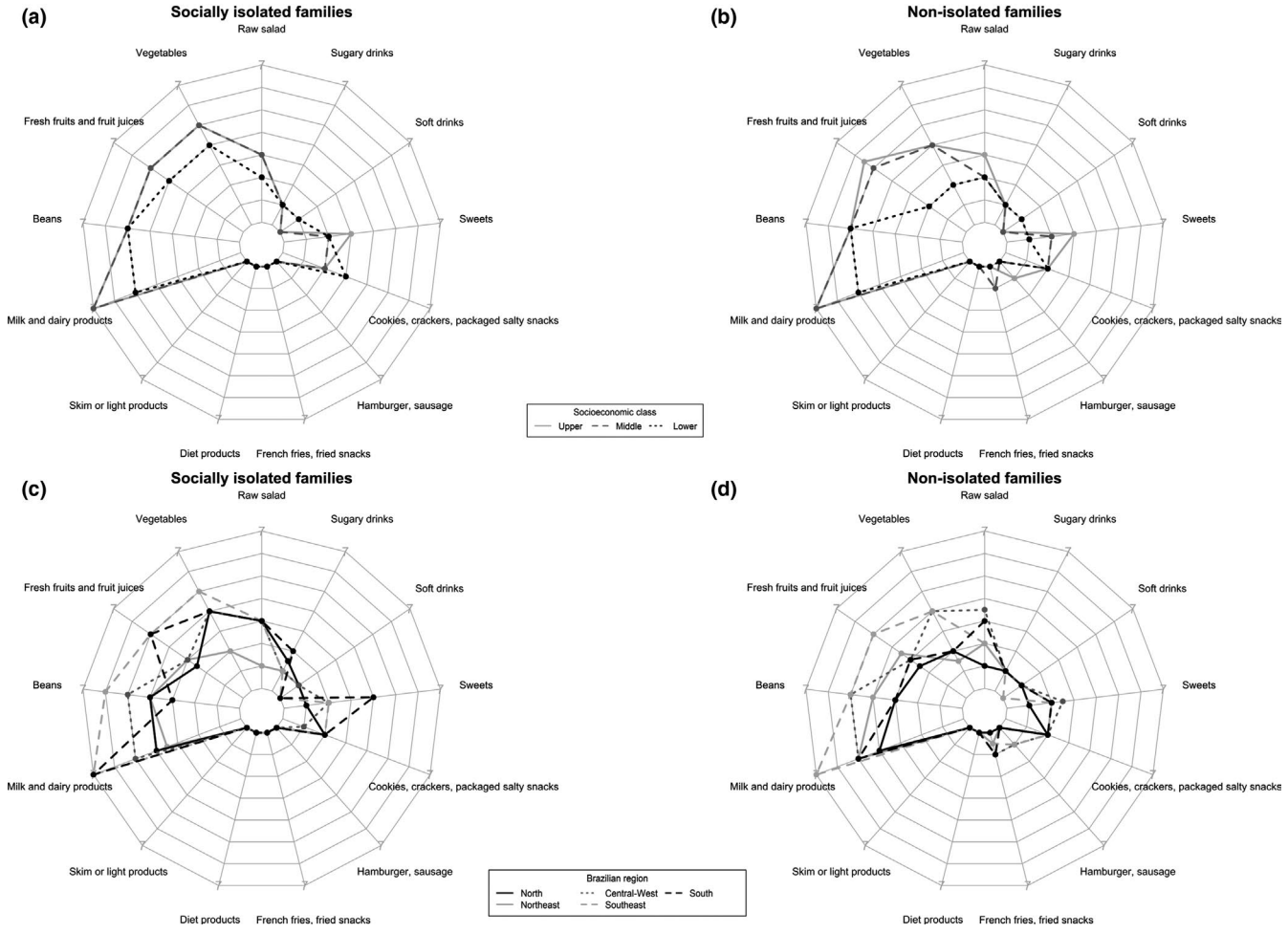

FIGURE 1 Median weekly frequency of consumption of foods according to socioeconomic class of socially isolated (A) and non-isolated (B) families and according to the Brazilian regions to which socially isolated (C) and non-isolated (D) families belong

television-watching, individuals tend to have high energy density foods, rich in fat and sugar, leading to outcomes such as excess body weight.[36] During the ongoing pandemic, it is important to identify children at nutritional risk because reduced health care delivery and health professional availability, coupled with challenges with respect to providing remote nutritional reviews, might worsen nutritional inadequacy.[37]

Regarding the frequency of food consumption, soft drinks were the only unhealthy eating marker consumed more frequently by non-isolated families. This may be explained by the fact that these families live in more economically developed regions and substitute large meals for snacks.[38,39] Eating behaviours rich in sweets, soft drinks and sugar-sweetened beverages are associated with an increased risk of dental caries, excess body weight, diabetes and cardiovascular diseases.[40]

Regarding healthy eating markers, the consumption of raw salad and vegetables was higher among isolated families. Such a habit may be associated with the purchasing power of these families because the distribution challenges for *in natura* foods make them less accessible for lower-class families.[41] We consider that the high intake of healthy eating markers reflect parents' concerns toward food, recognising their importance in strengthening the immune system[15]; children's lower exposure to unhealthy food environments such as school canteens with classes being suspended; and a greater concern with the risk of contamination by eating outdoors.[42]

Although we found no difference regarding the sedentary behaviours of both age groups, isolated or not, most study participants presented an excessive screen time and ahigh prevalence of physical inactivity. This may be explained by the suspension of several physical exercise opportunities as a result of the COVID-19 pandemic,[43] such as the closing of schools, sports clubs and public squares. Moreover, this situation probably contributed to a greater idleness and a consequent need for distraction, leading individuals to use electronic devices as a source of entertainment.

Although several weeks or a few months of physical inactivity will probably not result in an abrupt onset of metabolic disease, the sudden interruption of physical exercise may interfere with insulin sensitivity, cause muscle and bone loss, and diminish the psychological benefits of exercise.[44-46] At the same time, longer periods of sitting and exposure to screens may boost the consumption of ultra-processed foods as a result of their convenience as packaged-products, ready to eat or heat,[47] and the greater exposure

to the marketing of these foods .[6] Likewise, social isolation imposed a lack of regular exposure to natural light and increased exposure to artificial light from electronic devices, which may have contributed to the high levels of inadequate sleeping patterns observed in the present study.[48,49]

The present study has some limitations, such as the fact that our data reflect only short-term isolation consequences (up to 8-12 weeks) and cannot be generalised for longer periods of confinement. Moreover, dietary patterns were analysed based on a single-application questionnaire concerning food consumption in the preceding week, which may not reflect individual's usual intake. However, given that the study was conducted during the challenging confinement period imposed by the pandemic, food consumption evaluation was simplified aiming to avoid a negative effect of the questionnaire length on response rates.

Finally, by using an online questionnaire (the only possible modality as a result of social distancing), our sample may have been less representative regarding the diversity throughout Brazilian regions and more representative regarding middle-classes and the Southeast region. Still, socioeconomic disparities are so evident in Brazil, we consider that our research managed to capture these differences and how they relate to social isolation and its impact on eating habits during the COVID-19 pandemic.

CONCLUSIONS

The present study concludes that social isolation may influence the eating habits of children and adolescents by enabling non-isolated families to consume healthy food less frequently, particularly those of lower-classes, from Northeast Brazil, and adolescents. Considering that healthy dietary patterns play a key role in protecting individuals from the severity of COVID-19 and other infections, and also that children and adolescents are developing their eating habits, health authorities should reinforce nutritional support strategies targeting this age group, especially during the suspension of activities and social isolation.

TRANSPARENCY DECLARATION

The lead author affirms that this manuscript is an honest, accurate and transparent account of the study being reported; that no important aspects of the study have been omitted; and that all discrepancies from the study have been explained. This work was reported according to the Strengthening the Reporting of Observational Studies (STROBE) guidelines.

ACKNOWLEDGMENTS

We thank the families who participated in the study. This research received no specific grant from any funding agency or commercial or non-profit organisations.

CONFLICT OF INTERESTS

The authors have no conflict of interests.

AUTHORS CONTRIBUTION

MTT and SAR contributed to research conception, data collection, interpretation of results and critical review of the article. LMR and LAdA contributed to data analysis and interpretation, drafting and critical review of the article. RSV and JHdS contributed to data collection and critical review of the article. All authors agree to be accountable for all aspects of the work and ensure that questions related to the accuracy or integrity of any part of the work are appropriately investigated and resolved. This study was approved by the National Research Ethics Commission (protocol 4.014.180).

PEER REVIEW

The peer review history for this article is available at https://publons.com/publon/10.1111/jhn.12901.

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How to cite this article: Teixeira MT, Vitorino RS, da Silva JH, Raposo LM, Aquino LA, Ribas SA. Eating habits of children and adolescents during the COVID-19 pandemic: The impact of social isolation. *J Hum Nutr Diet*. 2021;34:670–678. https://doi.org/10.1111/jhn.12901