Review Article

IT Medical Team
https://www.itmedicalteam.pl/

Health Science Journal
ISSN 1791-809X

2023
Vol. 17 No. 8: 1051

Has the COVID-19 Pandemic Impacted the Food Consumption of People with Chronic Diseases?

Running Head: COVID-19 and impact in food consumption

Chayze de Souza Cunha[1], Sabrina Alves Durães[2], Melissa Ionara Ribeiro Sabbagh[3], Josiane Santos Brant Rocha[4], João Pedro Brant Rocha[5], Maria Clara Brant Rocha[6], João Gustavo Brant Rocha[7], Lucineia de Pinho[8], Luciana Neri Nobre[9]*

1. Universidade Federal dos Vales do Jequitinhonha e Mucuri, Postgraduate Program in Nutrition Sciences, Diamantina, Brazil
2. Universidade Federal de Minas Gerais. Postgraduate Program in Food and Health, Montes Claros, Brazil
3. Universidade Federal dos Vales do Jequitinhonha e Mucuri, Postgraduate Program in Nutrition Sciences, Diamantina, Brazil
4. Universidade Estadual de Montes Claros - Unimontes
5. Universidade Federal de Minas Gerais - UFMG, Belo Horizonte, Minas Gerais, Brasil
6. Faculdade Ciências Médicas de Minas Gerais. Belo Horizonte, Belo Horizonte, Minas Gerais, Brasil
7. Faculdade Ciências Médicas de Minas, Belo Horizonte, Minas Gerais, Brasil
8. Universidade Federal de Minas Gerais. Postgraduate Program in Food and Health, Montes Claros, Brazil
9. Universidade Federal dos Vales do Jequitinhonha e Mucuri, Postgraduate Program in Nutrition Sciences, Diamantina, Brazil

***Corresponding author:**
Luciana Neri Nobre

luciana.nobre@ufvjm.edu.br

Campus JK, Rodovia MGT 367 – Km 583, no 5000 – Alto da Jacuba, Diamantina/MG, 39100-000.

Fax: (38) 3532-6000

Department of Nutrition, Universidade Federal dos Vales do Jequitinhonha e Mucur

Citation: Souza Cunha CD, Duraes SA, Ribeiro Sabbagh MI, Brant Rocha JS, Brant Rocha JP, et al. (2023) Has the COVID-19 Pandemic Impacted the Food Consumption of People with Chronic Diseases?. Health Sci J. Vol. 17 No. 8: 1051.

Abstract

Objectives: To systematically review the evidence of the impact of the critical period of the COVID-19 pandemic on changes in food consumption by adults with chronic noncommunicable diseases (NCDs). Methods: Two evaluators analyzed the electronic databases Medline, SciELO, Embase and BVS between March 2020 and August 2021. Terms with the Boolean operator AND were used to search for publications: "eating habits" AND "COVID-19" AND adult. The publications included were assessed for methodological quality and a qualitative synthesis was performed. The revision was registered with PROSPERO (No CRD42021275171). Results: Of the 341 identified studies, 10 were included in the review, of which 50% observed that people with NCDs worsened their food consumption, and the others either did not observe changes in consumption or observed improvement in consumption. These results indicate that confinement had different repercussions among patients with NCDs, but the worsening in food consumption was the most prevalent. Conclusion: Social distancing favoured more commonly the practice of unhealthy consuming among people with NCDs indicating that in addition to being one of the groups most affected by the pandemic, it was more susceptible to negative changes in food consumption.

Keywords: COVID-19; Noncommunicable diseases; Adults; Food intake

Received: 03-Aug-2023, Manuscript No. Iphsj-23-14021; **Editor assigned:** 05-Aug-2023, Pre-QC No. Iphsj-23-14021(PQ); **Reviewed:** 19-Aug-2023, QC No. Iphsj-23-14021; **Revised:** 25-Aug-2023, Manuscript No. Iphsj-23-14021 (R); **Published:** 31-Aug-2023, DOI: 10.36648/1791-809X.17.8.1051

Introduction

The susceptibility to infection by the new coronavirus SARS-CoV-2 and the possibility of manifesting severe symptoms are potentially greater in individuals with chronic noncommunicable diseases (NCDs). These conditions are associated with the higher lethality of COVID-19 [1-3].

Among the most common NCDs are cardiovascular diseases [4], chronic respiratory diseases (bronchitis, asthma, rhinitis), hypertension, cancer, diabetes and metabolic diseases (obesity, diabetes, dyslipidemia) [1], and chronic kidney and liver diseases [3]. According to data from the World Health Organization (WHO), NCDs are responsible for 70% of deaths in the world [5], and in Brazil, they are the cause of 76% of deaths [6]. If NCDs alone cause many deaths, when associated with an infectious disease such as COVID-19, the number of deaths in patients with these diseases has been even higher, especially before vaccination against COVID-19 [7, 8].

Considering the importance of diet as a risk or protection factor for chronic diseases and their comorbidities, it is important to identify

risky eating patterns in critical periods such as the COVID-19 pandemic so that this information can support the development of public policies, effective health strategy interventions in the health sector, and quality of life by preventing or mitigating the evolution of injuries.

The influence of the COVID-19 pandemic on the eating behavior of people with NCDs is a topic that has yet to be explored. Thus, the purpose of this work is to shed light on this gap in view of the importance of food for strengthening the immune system, since chronic diseases are characterized by systemic inflammation that tends to affect the prognosis of COVID-19 [9].

Considering the assumptions set out above, the objective of this article is to verify whether adults with NCDs showed changes in eating behavior in the early years of the COVID-19 pandemic.

Methods

Study design, protocol and data collection

This is a systematic review submitted to the International Prospective Register of Systematic Review (Prospero) and approved under number CRD42021275171. For the review, the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (Prisma) [10] protocol was adopted. Before starting the search for articles, the PICO strategy, an acronym resulting from the words Patient/Problem/Population, Intervention, Comparison/Control and Outcomes, was used to structure the components related to the problem (Table 1). This is how the research question was structured: "Did adults with chronic noncommunicable diseases change their diet during the COVID-19 pandemic?" (**Table 1**).

To identify the research keywords, Health Sciences Descriptors (DeCS), Medical Subject Headings (MeSH) and keywords obtained from articles on the subject were used. Initial searches identified a high number of publications that did not meet the established eligibility criteria. Thus, an exploratory investigation was carried out to verify how the articles cited their keywords; those common in eligible works were used to compose the search terms and refine the works that would meet the criteria of this research. From this search, it was identified that the search terms together with the Boolean operator AND connector "eating habits" AND "COVID-19" AND adults were the most assertive to search for the articles proposed in this study. In addition to this strategy, the bibliographic references of the selected articles were also checked to try to identify an article on the subject that had not been identified during the search [11].

The bibliographic survey took place during the months of May to June 2021 in the electronic databases BVS, PubMed-MEDLINE (Online System for Research and Analysis of Medical Literature), Scielo and Embase.

Table 1. Description PICO.

PICO	Abbreviation	Elements
Participants	P	Adults with NCD
Intervention/Exhibition	I	Food consumption
Comparation	C	Adults without NCD
Outcomes	O	Change in food consumption

Eligibility criteria

Eligible studies should present the following aspects: I) be an original article; II) be conducted with humans during the COVID-19 pandemic; III) present target population adults, according to Ministry of Health criteria (>18 years < 60 years) of both sexes; IV) have NCD carriers in the target population and are identified in the study; V) have evaluated food consumption and present separate results for patients with NCDs and no carriers; and VI) be published in English, Spanish or Portuguese.

Articles that assessed consumption indirectly, through availability or acquisition, and those whose sample consisted of pregnant women, people with a special condition or who were not adults were disregarded.

Selection of studies

Articles included in this review were selected by two independent reviewers. Initially, a preliminary reading of the title and abstract of the works was carried out individually, identified in the electronic databases. Subsequently, duplicates were removed after analysis and comparison of titles, journal names, year of publication and authors in each database, considering the different languages. For data tabulation, the Microsoft Excel program was used.

Subsequently, the articles underwent in-depth reading of the full text, and those that met all the eligibility criteria were selected for this review. In cases of disagreement, a third reviewer conducted the trial. This third reviewer was also consulted about any doubts that arose during the in-depth reading of the articles.

Methodological quality assessment

The Strengthening the Reporting of Observational Studies in Epidemiology (Strobe) 12 initiatives was used to assess the methodological quality of the articles selected for this review. The use of this evaluation adds quality so that the conclusions found in the research can be generalized [12, 13].

Strobe is a checklist for observational studies. This list is composed of 22 items, of which 18 are common for cohort, case-control and cross-sectional studies and 4 are specific for each of these studies. The maximum score is 22 and consists of the presence or absence (1 or 0) of the information contained in the title and abstract (one item), introduction (two items), methods (nine items), the results (five items), discussion (four items) and other information (one item) [12,13].

After adding up the items listed in the checklist, the work can be considered of methodological quality A, B or C, meeting more than 80%, 50 to 80% and less than 50% of the criteria established in Strobe [14], respectively.

This evaluation was also carried out by two authors independently, and in case of doubt, a third researcher was consulted.

It is common in systematic reviews to also assess the quality of evidence in studies, generally using the grade system. However, considering that in this study intervention-type research will not be used as a clinical trial, and all of them are observational studies, it was considered unnecessary to carry out this evaluation since the Grade system considers that evidence from observational

studies is initially considered with level "low".

Analysis of results and statistics

The information extracted from the articles was used for the narrative synthesis of the results using descriptive statistics. The information extracted from the articles was the name of the main author, year of publication, country of study, type of design, sample size, age of participants, dietary survey used, adjustment variables and type of comorbidity, outcome and results regarding food consumption.

Results

Of the 341 articles identified in the electronic databases BVS, PubMed-MEDLINE, Scielo and Embase, 102 were removed because they were duplicates. After reading the title and abstract, reading the entire text and applying the eligibility criteria, eight studies were selected, and two articles, despite not having been identified in the search, were added due to the reading of bibliographic references of selected articles; thus, in the selection, a total of 10 articles were included in this review. The complete flowchart of the selection process is shown in Figure 1 and was based on the PRISMA method [15] (**Figure 1**).

The most prevalent NCDs among participants in the studies used in this review were overweight and/or obesity [16-22, 25], cardiovascular diseases [17, 19, 20, 24], and generalized anxiety disorder [16-18, 23, 24], and 80% had participants with excess weight [16-22, 25]. Regarding the question of this study, "whether NCD patients had changes in food consumption during the pandemic", the present review identified that 50% of the studies identified a worsening in food consumption [17-19,22,25], that is, those with these diseases consumed less healthy foods and lost control over their diets [17,18,25], showed less adherence to the Mediterranean diet [22], which is known to be cardiovascular protective, and increased consumption of snacks and food in general [17,18,25] and decreased consumption of functional foods [19].

Characteristics and methodological quality of the included studies

The characteristics and methodological quality of the publications included in this review are presented in Table 2. Of the total number of studies selected, seven were published in 2021 [16-22], eight were cross-sectional studies [16-20, 23-25], one was a control case [21] and one was longitudinal [22] (**Table 2**).

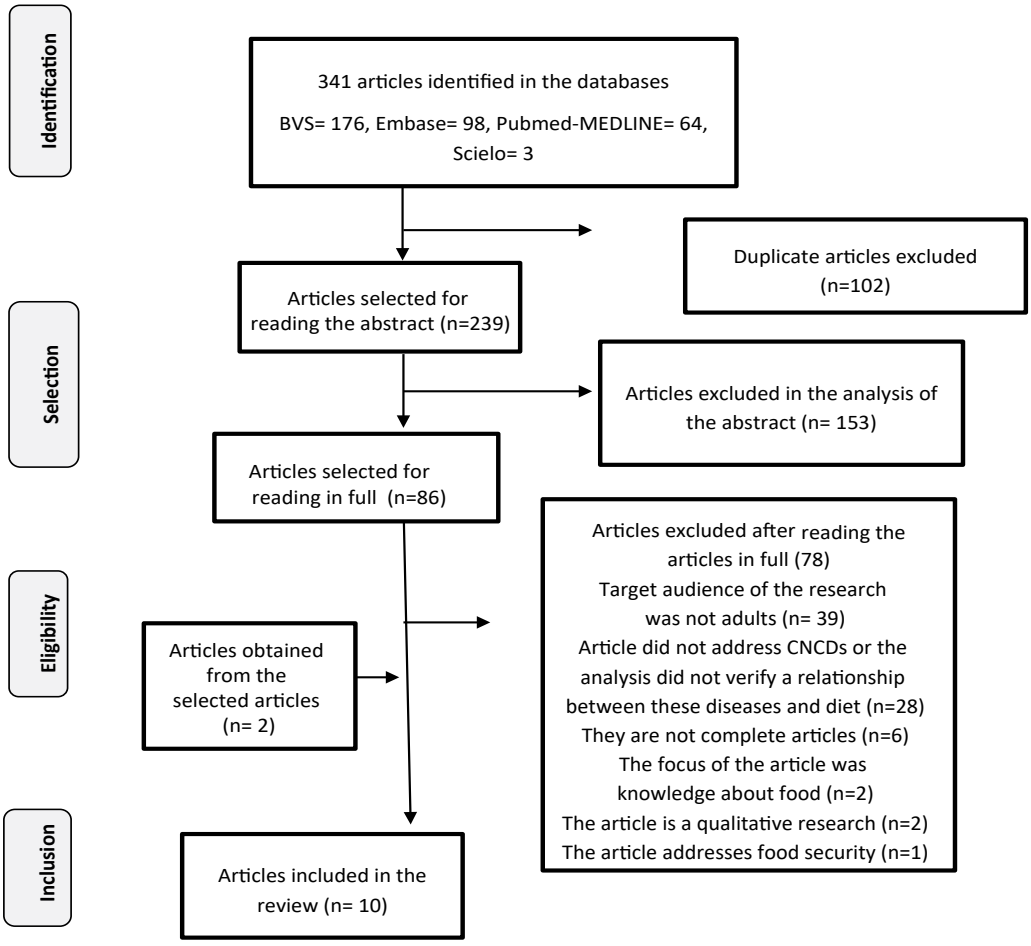

Figure 1 Flowchart of steps for research and selection of articles.

Table 2. Characteristics and methodological quality of the systematic review studies (n= 10).

Researchers	Country, Year of publication	Type of study	Sample size	Strobe Score (%)	Study quality (Strobe)
Czenczek-Kewandowska et al. [16]	Poland 2021	Pre and post pandemic retrospective	n= 506	18 (81.81)	A
			18 to 34		
Robinson et al. [17]	UK 2021	Transversal	n= 2002	20 (90.9)	A
			≥ 18		
Athanasiadis et al. [18]	US	Transversal	n= 208	19 (86.36)	A
	2021		48.9 ± 11.2		
Altun et al. [19]	Turkey	Transversal	n= 550	19 (86.36)	A
	2021		30.6 ± 9.1		
Al-Domi et al. [20]	Jordan	Transversal	n= 4473	15 (68.18)	B
	2021		≥ 18		
Grabia et al. [21]	Poland	Case-control	n= 219	18 (81.81)	A
	2021		18 a 32		
Tárraga Lopez et al. [22]	Spain	Observational, analytical, longitudinal and prospective	n= 490	13.0 (59.09)	B
	2021		48.8 ± 12.7		
Matsungo e Chopera, [23]	Zimbabwe 2020	Transversal	n= 507	17 (77.27)	B
			≥ 18		
De Boni et al. [24]	Brazil/Spain	Transversal	n= 3745	17 (77.27)	B
	2020		32 to 51		
Sidor e Rzymski et al. [25]	Poland	Transversal	n= 1097	19 (86.36)	A
	2020		27.7 ± 9.0		

With regard to methodological quality, six [16-19, 21, 25] met more than 80% of the criteria proposed by Strobe, and four [20, 22-24] met 50 to 80%, reaching an A and B classification, respectively. Participants resided in different countries, and the number of participants per sample ranged from 20818 to 4473 individuals [20].

Information regarding the effect of the pandemic on the food consumption of people with chronic diseases is presented in Table 3. It is observed that among the 10 studies included in the review, one [24] cites that individuals with a positive diagnosis for both depression and anxiety presented alterations in food consumption; however, the authors do not present which alterations, nor mention if they were positive or negative. Two [16,23] studies did not present results on changes in food consumption, considering the presence of chronic diseases, two mentioned improvement in food intake [20,21], and five studies mentioned worsening food consumption [17-19,22,25] (**Table 3**).

Discussion

This systematic review aimed to verify whether adults with NCDs showed changes in eating behavior in the early years of the COVID-19 pandemic. The analysis of the results of the studies included in this review indicated that 1) there were changes in food consumption according to the presence of NCDs; however, which changes were not presented if there was a worsening or improvement in consumption [24]; 2) there were no changes in food consumption according to the presence of NCDs [16,23]; 3) there was an improvement in food consumption among people with NCDs [20,21]; and 4) there was a worsening in food consumption among people with NCDs [17-19,22,25]. These results indicate that confinement had different repercussions among patients with NCDs [22]; however, worsening consumption was the most prevalent.

Of the total number of studies analyzed, only one established female participants [21] as a target audience, although in the others, this was also predominant [16-20, 22-25]. For Liu et al. [26] and Ajlouni et al. [27], women have a positive attitude toward online surveys and provide more accurate and consistent answers, especially when related to their interests [20].

From another perspective, Mattioli et al. [28] mention that rarely do women follow a healthy lifestyle based on an adequate diet, regular physical activity and weight control, as these are both costly and time consuming and, due to performing multiple roles, which consume time and energy, they are more exposed to psychosocial stressors, e.g., anxiety, depression and marital status. This may explain the worsening of eating habits identified in five of the analyzed studies [17-19, 22, 25]. Corroborating this information, Mascherini et al. [29] state that adult men and separated individuals were less affected by psychological distress during the pandemic.

Another explanation for the worsening of food consumption may be the recognized stress resulting from the experience of

Table 3. Summary of studies included in the systematic review (n= 10).

Researcher	Dietary Survey	Evaluated group	Adjustment variables	Comorbidities	Evaluated outcome	Main results
Czenczek-Kewandowska et al. [16]	Food consumption frequency questionnaire	Polish young adults	There was no statistical modeling with variable adjustment for food consumption analysis	Generalized anxiety disorder, overweight, obesity	Assessed whether and to what extent the outbreak of the Covid-19 pandemic affected the health behaviors of young adults	Did not show results of change in food consumption considering the presence of chronic diseases
Robinson et al. [17]	Short Food Frequency Questionnaire	UK adults	Age, sex, education, family income, ethnicity, diagnosis of psychiatric condition, risk group for COVID-19, formal or suspected diagnosis of COVID-19, maintenance of adequate weight and BMI	Overweight, obesity, previous diagnosis of psychiatric illness (such as anxiety, depression), having any illness such as diabetes, obesity bite, heart disease)	Behaviors related to weight and	Participants with higher BMI had lower levels of physical activity and diet quality.
					weight control barriers among adults during COVID-19 social lockdown	56% reported more frequent snacking and problems with food control compared to before blocking.
Athanasiadis et al. [18]	Validated questionnaire on eating habits	Americans undergoing bariatric surgery	There was no statistical modeling with variable adjustment for analysis of changes in food consumption	Obesity, generalized anxiety disorder	To quantify the impact of self- quarantine on bariatric patients and its relationship with weight gain	There was a change in eating habits, 45.5% reported eating less healthy food than before the pandemic.
						Consumption of snacks, considered bad eating behavior, was reported by 62.6%, followed by loss of food control (48.2%) and binge eating (19.5%).
Altun et al. [19]	Questionnaire on eating habits and use of dietary supplements, functional foods and herbal medicines	Turkish nutritionists who exercised leadership activities in the COVID-19 pandemic	Gender, age, length of career, BMI classification and presence of chronic disease.	Diseases: endocrine, neurological, allergic, respiratory system, digestive system, cardiovascular rheumatic diseases and overweight	Use of food supplements, functional foods and herbal medicines during the COVID-19 pandemic	Overweight (OR=0.180; p value=0.000) and obese (OR=0.183; p=0.003) nutritionists consumed less functional foods during the pandemic when compared to those with normal weight
Al-Domi et al. [20]	Questionnaire on eating practices	Jordanian population	There was no statistical modeling with variable adjustment	Overweight, obesity, diabetes mellitus, hypertension, thyroid dysfunction, cardiovascular disease, respiratory disease, kidney disease, liver disease	Effect of COVID-19 quarantine on nutritional behavior and healthy lifestyle practices among the Jordanian population	There was a significant increase in the percentage of participants who consumed breakfast (70.2% of individuals with excess 72.1% of those with obesity p<0.001) and dinner (52.0% of individuals with excess 53.5.1% of with obesity p<0.001)

Researcher	Dietary Survey	Evaluated group	Adjustment variables	Comorbidities	Evaluated outcome	Main results
						There was a significant increase in the consumption of dietary supplements with antioxidants (48.4% of overweight 45.3% of obese <0.038)
Grabia et al. [21]	Questionnaire on eating habits, including the Mediterranean Diet Adherence Screener (MEDAS)	Polish women with DM1, and healthy population	There was no statistical modeling with variable adjustment for food consumption analysis	Type I diabetes, overweight, obesity	Assess health behaviors and adherence to the Mediterranean diet during the second wave of COVID-19	People with diabetes more frequently consumed more than five meals (41%), or three to four meals a day (54%) ($p < 0.001$), when compared to those without diabetes.
						Consumed more servings of butter/margarine/cream, vegetables, olives, oil, fruits, meat and fish/seafood
Tárraga Lopez et al. [22]	Questionnaires: MEDAS (Mediterranean Diet Adherence Screener) and the modified PREDIMED (Mediterranean Diet Prevention).	Spanish adults	BMI and sex	Overweight and obesity	Habitual eating pattern before confinement and evaluate the evolution of adherence to the Mediterranean diet during a week during the COVID-19 period	Overweight women showed less adherence to the Mediterranean diet: MEDAS overweight and obese ($p=0.018$);
						PREDIMED modified overweight and obesity ($p=0.049$)
Matsungo e Chopera, [23]		Zimbabwean young adults		Generalized anxiety disorder	Investigate the impacts of the COVID- 19 induced lockdown	Did not show results of change in food consumption considering the presence of chronic diseases
					in Zimbabwe on nutrition,	
					physical activity, alcohol consumption and smoking	
De Boni et al. [24]		Brazilian and Spanish adults who worked on the front lines of COVID-19	There was no statistical modeling with variable adjustment for food consumption analysis	Generalized anxiety disorder, diabetes, heart disease, hypertension, stroke, bipolar disorder, schizophrenia,	To assess the prevalence and predictors of depression, anxiety and their comorbidity among	Of the individuals with a positive diagnosis for both depression and anxiety, 46.9% showed changes in food consumption ($p<0.001$). However, the authors do not present which alterations, nor mention whether they were positive or negative.
				HIV/AIDS, cancer, tuberculosis, cirrhosis and kidney disease	workers in Brazil and Spain	
Sidor e Rzymski et al. [25]		Polish adults	There was no statistical modeling with variable adjustment	Overweight, obesity	Whether nutritional and consumption habits were affected by the COVID-19 pandemic	Overweight and obese people have increased consumption of food and snacks (Pearson's $\chi 2$ $p<0.05$)

pandemic contexts, which, in addition to causing a significant personal burden [30], favor the appearance of negative changes in lifestyle [31] or exacerbate preexisting risk behaviors [32-34], including dysfunctional eating habits [35-40] with a focus on foods that are sources of refined carbohydrates, with a high glycemia index and high energy density [36], snacks rich in sodium, added sugars and total fats38 and the concomitant decrease consumption of fruits and vegetables [25,37]. Including an increase in the desire to consume a specific type of food, a behavior defined as craving for food [28, 39].

Confirming the above, Ruiz-Roso et al. [39] observed that during the lockdown caused by COVID-19, women with type 2 diabetes significantly increased their consumption of sugary foods (from 7.2 before social distancing to 9.4 servings per week during confinement, p= 0.0036), snacks (from 0.7 to 1.3 servings per week during the lockdown, p= 0.0025), and vegetables (from 10.7 before to 12.2 servings per week during the lockdown, p= 0.001). On the other hand, men also showed an increase in the consumption of sugary foods (from 10.1 to 12.3 servings per week, p= 0.0013) and vegetables (from 9.1 before to 10.8 servings per week during the blockade (p= 0.0049) but did not change their average consumption of snacks.

It is worth noting that during the pandemic, there was a drop in the purchasing power of many people around the world, especially those without a formal employment relationship, and people with low purchasing power may be living in food deserts or prone to food insecurity, which leads to the consumption of cheaper and unhealthy foods [41]. On the other hand, Athanasiadis et al.18 mention that at a time when the entire population is under stress, due to rising unemployment and fear of infection, people who are already suffering from financial difficulties are expected to pay less attention to their physical well-being.

Furthermore, the worsening in food consumption being more prevalent may have occurred because, for many respondents, food may have been the only comfort in the face of a hostile and insecure context. Even with a pathological condition that in the medium or long term can be aggravated by the consumption of unhealthy foods [18, 25, 39, 40, 42-44], satisfaction, in the short term, prevails to compensate for the lack of social support that pandemics do not promote.

Unlike other disasters, such as earthquakes, floods and tornadoes [18], loneliness, very common in the first two years of the pandemic, resulting from isolation as a measure to contain the spread of the SARS-CoV-244 virus, lack of contact with family members [45], the prolonged period of isolation; the excessive amount of exposure to the media and information about the disease [45], the feeling of boredom [39,44,46] depressive and anxious symptoms [44, 47] and feelings of uncertainty and guilt [46,48,49], fear of getting infected [45,50,51], dying or contaminating family members [49] may have favoured an increase in the consumption of unhealthy foods, which are mentioned in the literature as comfort food.

For Ammar et al. [40], the high psychological pressure and stress caused by confinement negatively affect the areas of the brain responsible for the self-regulation capacity necessary to control health behaviors, including nutrition and physical activity, which are the basis for weight control [42]. In the first years of the pandemic, a period in which social distancing was the world recommendation, there was an increase in sedentary lifestyle, increased food consumption and seclusion at home [16-18, 21, 29, 40, 44], and being full-time at home can also be understood as unlimited access to food.

Regarding the question of this study, that is, whether patients with NCDs had changes in food consumption during the pandemic, the present review identified that the most prevalent NCDs among the evaluated participants were overweight and/or obesity [16-22,25], cardiovascular diseases [17,19,20,24] and generalized anxiety disorder [16-18,23,24], and among the 10 studies evaluated, the majority (80%) had overweight participants [16-22,25], and 50% of the studies identified worsening food consumption [17-19,22,25], that is, they consumed less healthy foods and lost control over their diets [17,18,25], showed less adherence to the Mediterranean diet [22], which is known to be cardiovascular protective, increased consumption of snacks and food [17,18,25] and lower consumption of functional foods [19].

Other studies have also identified that obese people have become more vulnerable to a sedentary lifestyle and unhealthy diet, predisposing them to additional weight gain during the pandemic [28]. Obese people and people with anxiety/depression had an increase of 2.07 kg in body weight (p< 0.001), even after having received advice on diet [44]. Pellegrini et al. [44] also mentioned that obese participants ate 40% more than usual, 28% reported not having paid attention to the quality of food consumed, 50% consumed more sweets, 33% more snacks, and 17% more frozen foods/canned, while 18% consumed less fruit and vegetables than before the pandemic.

It should be noted that keeping the nutritional status and immune system preserved is essential, especially in a period of infection such as COVID-19, since the immune system is our first line of Defense [52,53] and keeping them preserved is especially important in patients with NCDs who were the most vulnerable in this pandemic [18,43,54], being the group with the highest rate of infection, complications [28-55-57] and deaths [1-3,7,8,58,59] in the most critical phase of the pandemic.

It is noteworthy, however, that we identified two studies that reported improvement in the food consumption of individuals with NCDs during the pandemic [20, 21]. Al-Domi et al. [20] observed an increase in the consumption of dietary supplements and breakfast consumption, while Grabia et al. [21] identified that the vast majority of participants (60% vs. 71%) were moderately adherent to the Mediterranean Diet Adherence Screener (MEDAS).

Converging with the above, Panagiotakos et al. [60] observed that individuals with one or more morbidities were more likely to adopt a healthier pattern during the pandemic. This study was not included in this review because, despite having evaluated people aged 17 to 92 years, it did not present results according to age group, which in this review are adults. In the study by Panagiotakos et al. [60], the authors identified that a healthier pattern was 1.42 times greater in hypertensive individuals (95%

CI: 1.21-1.78); 1.51 times higher in diabetic individuals (95% CI: 1.20-1.92); 1.52 times higher in individuals with dyslipidaemia (95% CI: 1.28-1.78); and 1.92 times higher in those with kidney disease (95% CI: 1.28-2.85) when compared to healthy people after adjustment for age, gender and education. These authors also identified that one in every 10 participants reported having improved both their eating habits and their physical activity status, and one in every five started or increased the frequency of using dietary supplements as immune system enhancers. Participants were people with a high level of education.

With regard to the level of education, Ogundijo et al. [61] considered that a higher educational qualification probably provides work, better income, and greater awareness of health-promoting behaviors, implying varied and healthier food choices. Thus, a low level of education may reflect more carelessness and less preventive behavior [25]. It is common for them to opt, more often, for highly processed foods to the detriment of less energetic, fresh and perishable foods, which are also commonly more expensive [44].

The adoption of healthier food consumption during the social distance caused by the pandemic identified in some studies can be justified by the more time available to cook and consume meals at home, reducing the need for ready meals, which are generally rich in fats, sugars and salt [28,29,39,44]. Spending more time with family can also be an added motivation to ensure health-promoting food choices for everyone. Furthermore, food consumption is influenced not only by an individual's preferences but also by where they eat [29] and with whom they eat [60].

On the other hand, two studies did not identify changes in food consumption during the period of social distancing [16, 23]. This result may indicate that the participants in these studies are well educated in relation to the diseases they are carrying and therefore did not need to improve their diet, nor were they led to a worsening of it, even in a stressful situation. Furthermore, exposure over a long period of stress may favor a resignification of the threat, so people can perceive it differently [21], including developing resilience and therefore being less vulnerable to changes.

In the studies in this review, young adults predominated, the age group most affected by mental health disorders61 and susceptible to changes, including changes in diet. Athanasiadis et al.18 identified that younger patients (coefficient= 0.196; P= 0.014) had exacerbated snacking habits and regained more weight (coefficient= 0.409; P< 0.001), while Ogundijo et al. [62] identified that older patients were less affected by purchasing habits and decisions about choosing healthy foods. Older people seem to be more aware of the importance of diet in controlling preexisting diseases [39].

Poor health habits are worrisome and impact both physical and mental health. Living in a country with additional problems such as social, political and structural inequalities during a health crisis such as COVID-19 may have directly affected mental health [24]. If, on the one hand, poor diet is comforting, it is also associated with weight gain [23,44], medium- and long-term complications of NCDs [21], and increased predisposition to viral infections and significantly worsens the course of COVID-19 [25,63].

From this review, it is possible to conclude that social distancing more commonly favoured the practice of unhealthy food consumption among patients with NCDs. The results presented suggest that this group, in addition to being potentially affected by the pandemic, was also more susceptible to negative changes in food consumption, which may have an unfavourable impact on health, contributing to an increase in BMI, glycemia imbalance, and lipid profile and worsening of the clinical picture of COVID-19. Bearing in mind the knowledge that diet is a risk factor that can be modified, the present study may contribute to the strengthening of scientific evidence that underlies the importance of self-care through diet for patients with NCDs and the fundamental role of nutritional and multidisciplinary follow-up to carry out this process.

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