

# The Influence of Anxiety During the Pandemic on the Dietary Behavior of Nutrition and Business Administration Students

## A Influência da Ansiedade em Período de Pandemia no Comportamento Alimentar de Estudantes de Nutrição e Administração

## La Influencia de la Ansiedad Durante la Pandemia en el Comportamiento Alimentario de Estudiantes de Nutrición y Administración

Lara Canever<sup>1</sup>, Lucielen de Brito Oliveira<sup>2</sup>, Raiana Bortoluzzi Zanellato<sup>3</sup>, Louyse Sulzbach Damázio<sup>4</sup>, Paula Vieira Guimarães<sup>5</sup>,  
Thaís Luciano Fernandes<sup>6</sup>, Alexandra Ioppi Zugno<sup>7</sup>

**How to cite:** Canever L, Oliveira LB, Zanellato RB, Damázio LS, Guimarães PV, Fernandes TL, et al. A The Influence of Anxiety During the Pandemic on the Dietary Behavior of Nutrition and Business Administration Students. 2024; 13(1): 839-55. Doi: <https://doi.org/10.36239/revisa.v13.n1.p839a855>

# REVISA

1. University of the Extreme South of Santa Catarina, Criciúma, Santa Catarina, Brazil.  
<https://orcid.org/0000-0002-4760-2426>

2. University of the Extreme South of Santa Catarina, Criciúma, Santa Catarina, Brazil.  
<https://orcid.org/0000-0002-0040-9581>

3. University of the Extreme South of Santa Catarina, Criciúma, Santa Catarina, Brazil.  
<https://orcid.org/0000-0002-6097-1226>

4. University of the Extreme South of Santa Catarina, Criciúma, Santa Catarina, Brazil.  
<https://orcid.org/0000-0002-0710-2320>

5. University of the Extreme South of Santa Catarina, Criciúma, Santa Catarina, Brazil.  
<https://orcid.org/0000-0003-2063-2331>

6. University of the Extreme South of Santa Catarina, Criciúma, Santa Catarina, Brazil.  
<https://orcid.org/0000-0002-4760-2426>

7. University of the Extreme South of Santa Catarina, Criciúma, Santa Catarina, Brazil.  
<https://orcid.org/0000-0001-6658-6444>

Received: 13/10/2023  
Accepted: 14/12/2023

### RESUMO

**Objetivo:** analisar a influência da ansiedade no comportamento alimentar em período de pandemia em estudantes dos cursos de Nutrição e Administração de uma universidade do Sul Catarinense. **Método:** Participaram da pesquisa 96 estudantes matriculados da 4ª à 8ª fase, com faixa etária entre 18 a 59 anos, de ambos os sexos. Foram coletados dados através de um questionário, contendo perguntas sobre alimentação, comportamento alimentar e sintomas de ansiedade. **Resultados:** Em geral, 41,6% (n=40) dos estudantes eram do curso de administração e 58,3% (n=56) de Nutrição. A maioria referiu consumir alimentos açucarados e gordurosos em momentos de ansiedade. Houve alterações no padrão alimentar, com destaque para alimentos ultraprocessados, fast food e bebidas alcoólicas, refletindo no peso corporal. **Conclusão:** o estudo evidenciou um aumento nos sinais e sintomas de ansiedade durante a pandemia, impactando o comportamento alimentar dos universitários.

**Descritores:** Comportamento Alimentar; Ansiedade; Pandemia.

### ABSTRACT

**Objective:** to assess the influence of anxiety on eating behavior during the pandemic in students of Nutrition and Business Administration courses at a university in Southern Santa Catarina. **Method:** A total of 96 enrolled students from the 4th to the 8th semester, aged 18 to 59, of both sexes, participated in the research. Data were collected through a questionnaire containing questions about diet, eating behavior, and anxiety symptoms. **Results:** Overall, 41.6% (n=40) of students were from the Business Administration course, and 58.3% (n=56) from Nutrition. The majority reported consuming sugary and fatty foods during moments of anxiety. There were changes in dietary patterns, with a focus on ultra-processed foods, fast food, and alcoholic beverages, reflecting on body weight. **Conclusion:** The study revealed an increase in signs and symptoms of anxiety during the pandemic, impacting the eating behavior of university students.

**Descriptors:** Eating Behavior; Anxiety; Pandemic.

### RESUMEN

**Objetivo:** evaluar la influencia de la ansiedad en el comportamiento alimentario durante la pandemia en estudiantes de los cursos de Nutrición y Administración en una universidad del sur de Santa Catarina. **Método:** Participaron en la investigación 96 estudiantes inscritos desde el 4º hasta el 8º semestre, con edades comprendidas entre los 18 y 59 años, de ambos sexos. Los datos se recopilaron a través de un cuestionario que contenía preguntas sobre alimentación, comportamiento alimentario y síntomas de ansiedad. **Resultados:** En general, el 41,6% (n=40) de los estudiantes eran del curso de Administración y el 58,3% (n=56) de Nutrición. La mayoría informó consumir alimentos azucarados y grasos en momentos de ansiedad. Hubo cambios en el patrón alimentario, con énfasis en alimentos ultraprocessados, comida rápida y bebidas alcohólicas, lo que se reflejó en el peso corporal. **Conclusión:** El estudio reveló un aumento en los signos y síntomas de ansiedad durante la pandemia, afectando el comportamiento alimentario de los universitarios.

**Descriptores:** Comportamiento Alimentario; Ansiedad; Pandemia.

ORIGINAL

## Introduction

In December 2019, an unknown infectious disease took hold in the city of Wuhan, China, and spread worldwide. The World Health Organization (WHO) characterized this situation as a pandemic in March 2020 and the disease became known as COVID-19.<sup>1</sup>

According to the Ministry of Health, COVID-19 is an acute respiratory infectious disease caused by the coronavirus, better known as SARS-CoV-2, potentially serious, highly transmissible and globally distributed. The main symptoms are characterized by fever, cough, loss of taste or smell, headache and throat, shortness of breath, diarrhea and muscle pain, which can lead to death.<sup>2</sup>

With the severe increase in COVID-19 contamination and to prevent the transmission of the disease between people, governments of several countries adopted the protocol requested by the WHO, which indicated quarantine, marked by isolation and social distancing to contain the spread of the pandemic. These measures aimed to restrict the movement of individuals who were exposed to the disease and reduce the risk of contamination<sup>3,4</sup>. Through these measures, establishments, shopping centers, companies, schools, universities and other services were "closed" or had to reorganize themselves to function, in order to avoid agglomeration between people. Likewise, Universities started to manage classes remotely, leading teachers and students to adapt to the new routines.

The effects of the pandemic directly influenced people's lives, with anxiety being one of the psychological changes that showed a significant increase during the pandemic. Anxiety is described as a vague and unpleasant feeling of fear and apprehension, characterized by tension or discomfort derived from anticipation of danger, something unknown or strange.<sup>5</sup> Thus, anxiety was reflected in changes in the eating behavior and nutritional status of university students. Eating behavior is a set of actions related to food, which begins with the decision, availability, method of preparation, utensils, times and division of meals and ends with the ingestion of food.<sup>6</sup>

Research has shown that during the period of social isolation there was a significant increase in the intake of ultra-processed foods and a reduction in the consumption of fruits and vegetables. This condition, therefore, led to excessive intake of "comfort foods", that is, foods that reduce stress, enhancing positive feelings and improving mood, which are characterized by foods rich in sugars and fats.<sup>7-12</sup>

In this sense, this study investigated the impact of the pandemic on anxiety and eating behavior of students of the Nutrition and Administration course at a University in the extreme south of Santa Catarina.

## Method

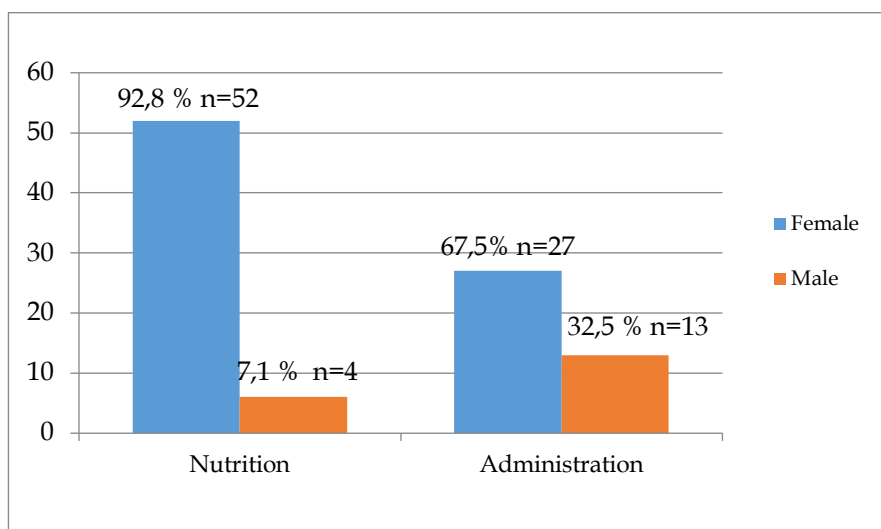
Descriptive, cross-sectional and quantitative research using primary data. The study was carried out with students of the Nutrition and Administration course of a University in the Extreme South of Santa Catarina. The coordinators of the courses were asked for authorization to develop the research. The population consisted of 56 students from the Nutrition course and 40 students

from the Administration course, enrolled from the 4th to the 8th phase, totaling the participation of 96 students. Students under or over the age group mentioned, from phases not corresponding to those mentioned above and/or students who refused to participate in the research were excluded.

The research was approved by the Research Ethics Committee (CEP) under opinion number 5,172,298. Questionnaires were applied online through google forms, containing questions about food, eating behavior and anxiety symptoms, as well as information such as weight and height self-reported by the students for Body Mass Index (BMI) analysis. After obtaining the data, they were analyzed with the aid of the IBM Statistical Package for the Social Sciences SPSS® software, version 21.0.

## Results and Discussion

The study had the participation of 96 students from a university in the extreme south of Santa Catarina, 41.7% (n=40) of whom were in the Administration course and 58.3% (n=56) in Nutrition. The distribution by sex shows that in the Business Administration course, 67.5% (n=27) were women and 32.5% (n=13) were men, totaling 41.6% of the sample. As expected, in the Nutrition course, 92.8% (n=52) of the sample was female, which confirms previous findings, where there was also a predominance of women in the Nutrition course.<sup>12,13</sup>



**Figure 1** - Profile of students by courses according to gender, Criciúma, SC.

Table 1 presents the profile of students based on age group, marital status, residence, income, and stage of graduation. Of the total sample, 89.6% (n=86) were between 18 and 29 years old. In the administration course, 97.5% (n=39), while in Nutrition 83.9% (n=47) of the students are in this age group<sup>13,14</sup>.

In the Business Administration course, 95.0% (n=38) of the students were single, while 5.0% (n=2) were married. In the Nutrition course, 78.6% (n=44) of the sample declared themselves single and 21.4% (n=12) married. Regarding residence, 80.0% (n=32) and 58.9% (n=33) of the students in the Administration and Nutrition course, respectively, lived with their parents. One study indicates that about 68.0% (n=248) of the students live with their families.<sup>14,15</sup>

These data provide an interesting insight into the demographics of students in both courses and may have implications for social dynamics and family support during the university period. It is worth noting the difference in marital status between the courses, which may suggest possible divergences in socioeconomic and cultural conditions among Administration and Nutrition students.

As for family income, most students receive 2 to 3 minimum wages or more than 3 minimum wages. In the Business Administration course, 10.0% (n=4) have an income of less than 1 minimum wage, 25.0% (n=10) of 2 to 3 minimum wages, and 65.0% (n=26) of more than 3 minimum wages. In the Nutrition course, 14.3% (n=8) received less than 1 minimum wage, 48.2% (n=27) from 2 to 3 minimum wages, and 37.5% (n=21) more than 3 minimum wages. Regarding the age group that most predominated in both courses was between 18 and 29 years old.

In summary, data on students' household income provides valuable insights into the financial context in which they are inserted. This information can be instrumental in planning support strategies and ensuring that all students have adequate conditions to obtain a quality education.<sup>16</sup>

Table 1 shows the phase in which the students are attending the undergraduate course. In the Business Administration course, there was a predominance of students from the 5th phase (30.0% (n=12), while in the Nutrition course, there was a predominance of 48.2% (n=27) students from the 7th phase, followed by 19.6% (n=11) enrolled in the 6th phase of the course.

**Table 1** - Profile of students by course, Criciúma, SC. 2022.

Variables	Nutrition		Administration		Total	
	(n=56)	%	(n=40)	%	(n=96)	%
<b>Age in years</b>						
From 18 to 29 years old	47	83,9	39	97,5	86	89,6
30 to 49 years old	8	14,3	1	2,5	9	9,4
50 to 59 years old	1	1,8	-	-	1	1,0
<b>Marital status</b>						
Married	12	21,4	2	5,0	14	14,6
Single	44	78,6	38	95	82	85,4
<b>As who resides</b>						
Grandparents	-	-	1	2,5	1	1,0
Spouse and children	14	25,0	2	5,0	16	16,7
Students	4	7,2	1	2,5	5	5,2
Parents	33	58,9	32	80,0	65	67,7
Alone	5	8,9	4	10,0	9	9,4
<b>Household income</b>						
Less than 1 minimum wage	8	14,3	4	10,0	12	12,5
From 2 to 3 minimum wages	27	48,2	10	25,0	37	38,6
More than 3 minimum wages	21	37,5	26	65,0	47	48,9
<b>Phases</b>						
4 <sup>a</sup>	5	8,9	5	12,5	10	10,4
5 <sup>a</sup>	9	16,1	12	30,0	21	21,8
6 <sup>a</sup>	11	19,6	5	12,5	16	16,7
7 <sup>a</sup>	27	48,2	9	22,5	36	37,5
8 <sup>a</sup>	4	7,2	6	15,0	10	10,4
No information	-	-	3	7,5	3	3,2

Table 2 presents the signs and symptoms of anxiety related to the pandemic in the students who participated in the study. Regarding the medical diagnosis of anxiety, 20.8% (n=20) of the sample confirmed this condition.

When asked "do you (students) consider yourself anxious", 73.9% (n=71) said yes, and in the administration course 65.0% (n=26) reported being anxious, while in the nutrition course 80.3% (n=45) of the students considered themselves anxious.

Anxiety factors among students, such as work, poor diet, lack of routine, and academic life are presented in Table 2. A study investigated which emotional difficulties affect university students and the most reported were: Academic Pressure, Competitive Environment, Financial Concerns, Mental Health Problems, among others<sup>17</sup>.

When asked about "how they deal with anxiety", 41.7% (n=40) of the sample reported looking for something to eat, 45.0% (n=18) in the Business Administration course and 39.3% (n=22) in Nutrition. Regarding the symptoms of anxiety associated with food consumption during social isolation, in general, 70.8% (n=78) of the students stated that they increased their food consumption during anxiety episodes, and 60.4% (n=24) felt more desire to consume sweets at these times. Both the students of Administration and Nutrition reported an increase in the desire for sweets in situations of anxiety, representing about 60.7% (n=34) of the sample. These findings corroborate, at least in part, a study conducted by Scarponi<sup>18</sup>, where individuals who reported eating more food during social isolation during the pandemic had higher anxiety scores<sup>18</sup>.

The search for sugary foods during anxiety occurs in an attempt to relieve symptoms, as these foods stimulate the release of hormones associated with pleasure and positive emotions<sup>18</sup>. A study investigated the consumption of processed foods in individuals with GAD and observed that the consumption of sweets daily was reported by 13.9% (n=139) of anxious students, reflecting that individuals diagnosed with anxiety had a higher frequency of consumption of these foods<sup>19</sup>.

As shown in Table 2, in the administration course, 77.5% (n=31) of the students stated that food consumption increases during anxiety episodes, while 22.5% (n=9) reported a reduction in food consumption. In the nutrition course, 66.1% of the students (n=37) mentioned an increase in food consumption in situations of anxiety, while 33.9% (n=19) indicated a decrease in this intake.

The symptoms most frequently reported by the students were changes in heart rhythm reported by 62.5% (n=60) of the sample, followed by intestinal changes by 27.6% (n=52) of the sample. The student was also asked if he "felt anxious due to online classes" and the results show a balance in the answers, with 47.9% (n=46) reporting anxiety in relation to remote classes, while 52.1% (n=50) did not feel anxious. A study conducted with 96 students revealed that 62.5% (n=60) of the sample declared themselves more anxious about remote learning, while 37.5% observed no difference in the state of anxiety due to this condition<sup>20</sup>.

**Table 2 - Signs and symptoms of anxiety and food intake, Criciúma, SC, Brazil. 2022.**

Variables	Nutrition		Administration		Total	
	(n=56)	%	(n=40)	%	(n=96)	%
<b>Has a diagnosis of anxiety</b>						
Yes	12	21,4	8	20	20	20,8
No	44	78,6	32	80	76	79,2
<b>Consider yourself anxious</b>						
Yes	45	80,3	26	65	71	73,9
No	6	10,7	10	25	16	16,7
Don't know	5	9	4	10	9	9,4

Variables	Nutrition		Administration		Total	
	(n=56)	%	(n=40)	%	(n=96)	%
<b>What makes you anxious?</b>	(n=137)		(n=89)		(n=226)	
Work	41	29,9	25	28,1	66	29,2
Poor diet	16	11,7	11	12,3	27	11,9
Lack of routine	23	16,8	14	15,7	37	16,4
Academic life	43	31,4	28	31,5	71	31,4
Other	14	10,2	11	12,4	25	11,1
<b>When anxious, what do you do?</b>						
I'm looking for something to eat	22	39,3	18	45	40	41,7
I lose my appetite	11	19,6	3	7,5	14	14,6
I try to relax	12	21,4	8	20	20	20,8
Nothing changes in my routine	4	7,1	4	10	8	8,3
Other	7	12,6	7	17,5	14	14,6
<b>When anxious, the desire for sweets increases</b>						
Yes	34	60,7	24	60	58	60,4
No	22	39,3	16	40	38	39,6
<b>When anxious, food consumption increases or decreases</b>						
Increases	37	66,1	31	77,5	68	70,8
Decreases	19	33,9	9	22,5	28	29,2
<b>When anxious, what symptoms do you have</b>	(n=117)		(n=81)		(n=188)	
Dry mouth	8	6,8	6	7,4	14	7,4
Shortness of breath	24	20,5	13	16	37	19,7
Intestinal changes	29	24,9	23	28,4	52	27,6
Change in heart rhythm	35	29,9	25	30,8	60	31,9
Other	21	17,9	14	17,4	25	13,4
<b>Been more anxious during the pandemic</b>						
Yes	44	78,6	27	67,5	71	73,9
No	12	21,4	13	32,5	25	26,1
<b>Felt anxious about online classes</b>						
Yes	32	57,1	14	35	46	47,9
No	24	42,9	26	65	50	52,1

Figure 2 reflects the changes in students' routines due to the pandemic, whether at work, in studies, in food, or in physical activity. In general, 78.1% of the sample (n=75) reported changes in their routine due to the pandemic, and in the Business Administration course, 77.5% of the students (n=31) said they had experienced changes, while 22.5% (n=9) had no changes. A study developed with 371 participants investigated whether there were changes in their routine during the pandemic and found that 40.0% (n=149) of the sample stated that their routine was completely changed, 26.0% (n=96) reported small changes and 2.0% (n=7) of the sample did not notice changes in their routine<sup>21</sup>.

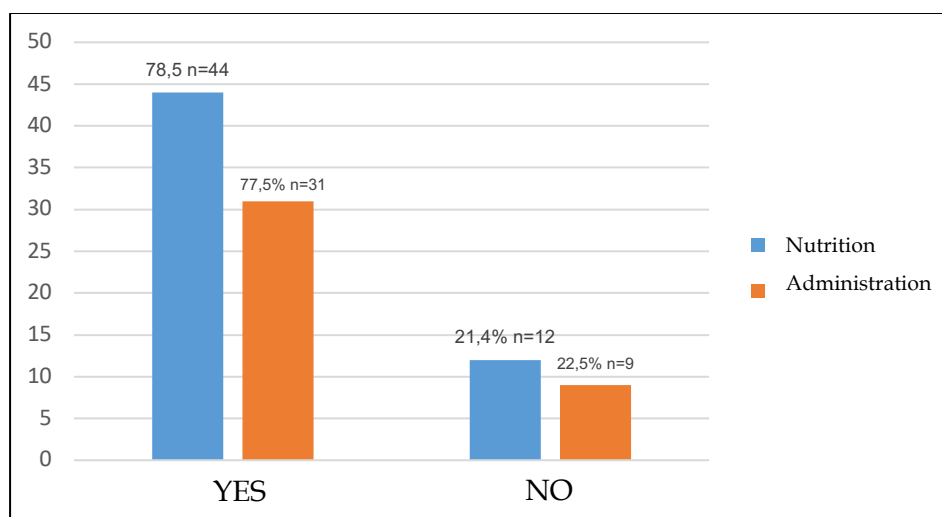


Figure 2 - Change in routine due to the pandemic according to the course, Criciúma, SC.

Table 3 describes that there was an increase in water consumption by students when compared to intake before and during the pandemic, which is a positive data from the study. Before the pandemic, 12.5% of the students (n=12) reported consuming 6 to 7 glasses of water per day, while during the pandemic, 25.0% of the sample (n=24) mentioned this consumption. A study that compared water intake during the period of social isolation also found an increase in water consumption, where 21 participants started to consume more than 2 liters of water a day during the pandemic.<sup>22,23</sup>

The consumption of vegetables before the pandemic was 62.5% (n=60) and during the pandemic there was an increase in the consumption of these food items to 66.7% (n=44) by students. The intake of animal protein remained similar before and during the pandemic, with daily consumption reported by 89.6% (n=86) of the students. Recent studies present similar results regarding protein consumption during the pandemic, where 90% (n=90) of the participants have a daily protein intake<sup>23,24</sup>. Similarly to proteins of animal origin, for the group of legumes and oilseeds, it was observed that consumption practically remained the same before and during the pandemic. In general, 54.2% (n=52) of the students reported that they consumed these food options daily.

Table 3 also shows an increase in fruit consumption during the pandemic, which is a positive result. It was found that the daily and weekly consumption of fruits by students before the pandemic was 47.9% (n=46) and 36.5% (n=35), respectively, being changed to 49.0% (n=47) and 42.7% (n=41) during the pandemic.

Table 3 - Eating habits of students before and during the pandemic, Criciúma, SC.

Variables	Before		After	
	n	%	n	%
<b>Water consumption</b>				
1 glass of water per day	9	9,4	2	2,1
2 to 3 glasses of water per day	21	21,9	14	14,6
4 to 5 glasses of water per day	22	22,9	18	18,8
6 to 7 glasses of water per day	12	12,5	24	25,0
7 to 8 glasses of water per day	15	15,6	13	13,5
9 to 10 glasses of water per day	17	17,7	25	26,0

Variables	Before		After	
	n	%	n	%
<b>How many meals in the day</b>				
1 to 2 meals per day	11	11,5	4	4,2
3 to 4 meals per day	54	56,3	46	47,9
5 to 6 meals a day	29	30,2	45	46,9
7 > more meals per day	2	2,1	1	1,0
<b>Consumption of vegetables</b>				
Daily	60	62,5	64	66,7
Weekly	21	21,9	25	26,0
Every fifteen days	10	10,4	5	5,2
Does not consume	5	5,2	2	2,1
<b>Consumption of animal protein</b>				
Daily	86	89,6	86	89,6
Weekly	7	7,3	7	7,3
Every fifteen days	1	1,0	1	1,0
Does not consume	2	2,1	2	2,1
<b>Fruit consumption</b>				
Daily	46	47,9	47	49,0
Weekly	35	36,5	41	42,7
Every fifteen days	9	9,4	4	4,2
Does not consume	6	6,3	4	4,2
<b>Cereal consumption</b>				
Daily	75	78,1	74	77,1
Weekly	15	15,6	18	18,8
Every fifteen days	5	5,2	3	3,1
Does not consume	1	1,0	1	1,0
<b>Consumption of legumes -oilseeds</b>				
Daily	52	54,2	51	53,1
Weekly	31	32,3	33	34,4
Every fifteen days	8	8,3	7	7,3
Does not consume	5	5,2	5	5,2

Overall, these findings suggest that, despite the challenges of the pandemic, students demonstrated, at least in some respects, an ability to adapt and maintain healthy eating habits. Awareness of the importance of hydration and the increase in the consumption of foods such as vegetables, legumes and fruits point to a positive response, which may be a reflection of the pandemic and concern for health. However, it is crucial to continue monitoring these dietary patterns through research that can identify possible food errors or escapes, so that nutritional interventions can be proposed in favor of improvements to a balanced and healthy diet among students, which, consequently, will contribute to better physical, social and mental well-being.

Table 4 also shows that during the pandemic there were changes in the students' eating habits. Notably, the consumption of whole foods increased, from 38.5% (n=37) to 41.7% (n=40), which suggests a positive trend towards healthier food choices. On the other hand, the daily consumption of ultra-processed foods also increased, with an oscillation from 5.2% (n=5) before the pandemic to 10.4% (n=10) during the pandemic. Surprisingly, the daily consumption of sweets had a small variation, from 17.7% (n=17) to 18.8% (n=18) during the pandemic. These results signal an alert to the possible impact of the pandemic on students' eating behavior, possibly related to the state of anxiety reported by most university students. In fact, food choices may have fluctuated according to the emotional and mental conditions of students in the pandemic, which impacted the quality of food.

A study conducted by Rocha<sup>25</sup> found results similar to those of this research, pointing out that of 857 university students, 89.03% (n=719) increased the consumption of ultra-processed foods during the pandemic and 16.01% (n=138) of the students decreased such consumption<sup>25</sup>.



**Table 4 - Food consumption of students before and during the pandemic, Criciúma, SC.**

Variables	Before		During	
	n	%	n	%
<b>Consumption of whole foods</b>				
Daily	37	38,5	40	41,7
Weekly	39	40,6	40	41,7
Every fifteen days	7	7,3	8	8,3
Does not consume	13	13,5	8	8,3
<b>Consumption of ultra-processed foods</b>				
Daily	5	5,2	10	10,4
Weekly	40	41,7	34	35,4
Every fifteen days	46	47,9	43	44,8
Does not consume	5	5,2	9	9,4
<b>Consumption of Sweets</b>				
Daily	17	17,7	18	18,8
Weekly	35	36,5	36	37,5
Every fifteen days	31	32,3	32	33,3
Does not consume	13	13,5	10	10,4

The results reveal a complex dynamic in the eating behavior of students during the pandemic. The reduction in the number of students who say they do not consume whole foods suggests a possible awareness of the importance of these foods for health. However, the increase in the daily consumption of ultra-processed foods can be a cause for concern, highlighting the need for nutritional strategies for healthy eating in situations of stress and anxiety.

In view of the variations in food consumption before and during the pandemic, it is clear that such responses were influenced by the behavioral issues impacted by the pandemic. The significant increase in the consumption of ultra-processed foods, also observed in other studies, confirms the complexity of factors that influence food choices.<sup>3,25,26</sup>

Regarding sweets, the small variation may indicate a relative stability in this consumption pattern, despite the changes in the pandemic environment. This can be the result of psychological factors, such as emotional comfort or simply habits already ingrained by the students.

The findings of the present study highlight the importance of personalized approaches in promoting healthy eating behaviors, recognizing individual nuances and contextual influences. In addition, they highlight the continuous need for monitoring and intervention to support students' nutritional health at times that generate more anxiety.

Table 5 shows the frequency of consumption of fast food, sweetened beverages and alcoholic beverages by students. Of the total sample, 52.1% (n=50) reported that there was an increase in fast food consumption during the pandemic. For the intake of alcoholic beverages, the results drew attention, since 59.4% (n=57) of the students stated that they had increased the consumption of these beverages during the pandemic, with weekly consumption of both fast food and alcoholic beverages by students predominating.

**Table 5** - Frequency of consumption of ultra-processed foods during the pandemic, Criciúma, SC.

Variables	Frequency	
	n	%
<b>Fast food consumption increased</b>		
Yes	50	52,1
No	46	47,9
<b>If Yes what frequency</b>		
Daily	5	5,2
Weekly	36	37,5
Every fifteen days	9	9,4
<b>Consumption of sweet drinks increased</b>		
Yes	25	26
No	71	74
<b>If Yes what frequency</b>		
Daily	11	11,5
Weekly	11	11,5
Every fifteen days	3	3,1
<b>Consumption of alcoholic beverages increased</b>		
Yes	57	59,4
No	43	40,6
<b>If Yes what frequency</b>		
Daily	4	4,2
Weekly	23	24,0
Every fifteen days	12	12,5

It is important to consider that these results reflect an average and that there are individual variations. Understanding the factors that contribute to the increase in the consumption of fast food and alcoholic beverages by some students can lead to personalized interventions in order to promote healthier food and lifestyle choices among the university population.

The nutritional status of students before and during the pandemic is described in Table 6. In the administration course, 15% (n=6) of the students were underweight before the pandemic. On the other hand, during the pandemic, cases of underweight decreased to 2.5% (n=1), which suggests that these students may normalize their nutritional status to normal weight or change to obesity, since these classifications increased during the pandemic.

In the nutrition course, it can be seen that before the pandemic, the nutritional status of normal weight predominated. However, during the pandemic, there was a reduction in the number of eutrophic students from 76.8% (n=43) to 69.6% (n=39), due to the increase in the classifications of underweight, overweight and obesity among these university students.

The decline in underweight cases among Business Administration students may be a reflection of positive changes in eating habits, such as greater consumption of fruits, vegetables, and whole foods, or it may be due to students' awareness of the importance of healthy eating during the pandemic. Similarly, the increase in cases of overweight among Nutrition students may be related to the increased consumption of fast food and sweets, that is, processed foods. In any case, such changes in nutritional status may be related to behavioral changes caused by the pandemic, which reflected in the food choices and, to a certain extent, in the nutritional status of some university students.

A study investigated 700 individuals and observed that during the pandemic period, 83% (n=581) of the sample remained in isolation for some time. In general, 54.0% (n=323) of the participants reported weight gain during social isolation, and 14.0% (n=98) stated that they were in a state of anxiety throughout the pandemic. These data are similar to the findings of the present study, reinforcing the importance of analyzing the influence of anxiety during the pandemic on the eating behavior and nutritional status of the population<sup>27</sup>.

**Table 6 - Comparison of Nutritional Status before and during the pandemic, Criciúma, SC.**

Nutritional status *	Nutrition (n=56)				Administration (n=40)			
	Before		During		Before		During	
	n	%	n	%	n	%	n	%
Low Weight	6	10,7	7	12,5	6	15	1	2,5
Eutrophy	43	76,8	39	69,6	21	52,5	25	62,5
Overweight	5	8,9	8	14,3	11	27,5	9	22,5
Obesity I	1	1,8	1	1,8	2	5	5	12,5
Obesity II	-	-	1	1,8	-	-	-	-
Obesity III	1	1,8	-	-	-	-	-	-

Table 7 shows the mean weight and BMI before and during the pandemic. In general, the average weight of the students before the pandemic was 62.2 kg ( $\pm 13.7$ ) and the BMI was 22.55 kg/m<sup>2</sup> ( $\pm 4.0$ ), and when comparing these variables before and during the pandemic, a statistically significant difference was observed ( $p < 0.05$ ). The average weight during the pandemic was 64.5 kg ( $\pm 14.5$ ) and the average BMI was 23.37 kg/m<sup>2</sup> ( $\pm 4.05$ ). Such variations in weight and BMI are also associated with changes in eating patterns, level of physical activity, and even the mental health conditions of students during the pandemic.

In addition, the increase in average weight and BMI may be related to stress and anxiety, factors that may contribute to such variations. In addition, the remote study environment may have influenced physical activity levels, contributing to changes in the physical profile and, consequently, in the nutritional status of students. It is worth mentioning that the nutritional status of the individual is beyond their weight and BMI, and it is essential to consider other markers that assess body composition, in addition to biochemical tests and the interaction between mental and physical health to draw a nutritional profile of the student.

It is well known that increasing weight and BMI can have long-term health implications, such as increased risks for chronic non-communicable diseases. Thus, health promotion strategies that emphasize the importance of adequate eating habits, physical activity, and emotional support can be essential to ensure that university students maintain a balanced physical and mental health profile.

As limitations, this study highlights the fact that the research was applied remotely, which limited the collection of anthropometric data, as well as the analysis of the students' body composition, in addition to the collection of other health indicators, such as some biochemical tests. In general, and in view of the findings presented, it is emphasized that public health strategies and personalized nutritional interventions are necessary to promote a healthy physical and mental balance during and after challenging situations such as the pandemic.

**Table 7** - Comparison of weight and BMI before and during the pandemic, Criciúma, SC. 2022.

Variables	Mean	Standard Deviation	Minimum Value	Maximum Value	*p value
Weight Before	62,2kg	±13,7	43kg	120kg	0,000
Weight During	64,5kg	±14,5	46kg	110kg	
BMI Before	22,55	±4,00	15,57	40,56	0,000
BMI During	23,37	±4,05	17,30	30,06	

\*Pearson's chi-square test.

This study was composed of 33 professionals, including twelve nurses (36%), five physicians (15%), four community health agents (12%), four nursing technicians (12%), three nursing assistants (9%), two oral health agents (6%), two dentists (6%) and one nursing resident (3%) (Table 1). The age range ranged from: 31 - 40 years (39%), 41 and 50 years (27%), over 51 years (18%) and 18 - 30 years (15%). A predominance of females (82%) was observed.

At the BHU, the workload can vary predominantly between 20 and 40 hours per week, with 79% (n=26) of the participants working 40 hours, 9% (n=3) working 20 hours and 12% (n=4) working different hours, such as Nursing Resident (60 hours), Physician (50 hours), Physician (24 hours) and Nursing Technician (36 hours).

Regarding the years of professional training, the category of nurse stood out with more than ten years of training (Table 7).

**Table 7-** Sociodemographic characteristics of the study participants (n=33), Paraná, 2022.

Profession	Participants		Formative time			
	n	%	< 1 year	1 to 5 years	5 to 10 years	> 10 years
Nurse	12	36		3	1	9
Doctor	5	15	1	1	1	2
Community Health Agent	4	12		1		3
Nursing Technician	4	12		1	1	2
Nursing Assistant	3	9				3
Oral Health Agent	2	6			1	1
Dentists	2	6				2
Nursing Resident	1	3		1		
<b>Age</b>						
18-30 years old	5	15				
31-40 years	13	39				
41-50 years old	9	27				
51 more years	6	18				
<b>Sex</b>						
Female	27	82				
Male	6	18				
<b>Workload</b>						
20 hours	3	9				
40 hours	26	79				
Other	4	12				

The research was based on the investigation of the knowledge of professionals in basic health units about HTLV through a questionnaire. To the question: "Do you know or have you heard about the HTLV virus?" the predominant answer was "Yes" with 61% (n=20) of the answers. Participants who reported "No" knowledge of the disease (39% n=13) ended their participation at this point in the study. Among these participants, most have professional training for more than ten years (Table 8).

**Table 8-** Answers No to the question: "Do you know or have you heard about HTLV?" in relation to the years of formation, Paraná, 2022.

No	Years of professional training			
	< 1 year	1 to 5 years	5 to 10 years	> 10 years
Nurse				2
Doctor				
Community health worker		1		3
Nursing technician				
Nursing assistant				3
Oral health worker			1	1
Dentistry				2
Nursing resident				

Regarding the question: "How did you find out about HTLV?", 50% (n=10) of the professionals answered that they learned about it during their academic training or in the technical course, 30% (n=6) reported hearing about the disease through television or the internet, 15% (n=3) had contact with the theme in their daily work. In the question referred to, it is highlighted that no professional stated that he had participated in educational actions on the subject, and 5% (n=1) stated that he had been approached about the disease during blood donation.

Regardless of the form of knowledge acquired about the disease, in the question: "Do you know the forms of transmission?", 95% (n=19) of the professionals stated that they knew that the forms of transmission of the virus are through unprotected sexual intercourse, shared use of needles and syringes, via placental and breastfeeding (Table 9).

To the question: "These are diseases that can affect HTLV patients, except", 65% (n=13) answered that Kaposi's Sarcoma is an opportunistic disease and that HTLV patients cannot be affected by this disease, 20% (n=4) answered Lymphoma/Leukemia and 15% (n=3) of the professionals were unaware of the diseases associated with the STI in question.

In the question: "What are the forms of diagnosis?", all participants reponder that the blood test is the gold standard for detecting the disease. Regarding the follow-up of the disease, in the question: "Regarding treatment, check:", 50% (n=10) of the participants stated that there is no specific treatment for HTLV, 30% (n=6) believe that there is a possibility through the use of antivirals, 10% (n=2) immunosuppressants and another 10% do not know the appropriate type of treatment.

To the question: "These are forms of prevention, with the exception of:", the vast majority of participants 70% (n=14) answered that vaccination is not a form of HTLV prevention, 25% (n=5) stated that the use of condoms is not effective against contagion and 5% (n=1) did not know how to answer. None of

the participants answered the use of disposable syringes and needles.

In the question: "What was your greatest difficulty in caring for patients with HTLV?", 80% (n=16) answered that they did not have difficulties during the care of these patients, the other 20% (n=4) answered that the difficulty resulted from the lack of knowledge of the pathology, lack of specific training about the disease, absence of symptoms and due to the theme being little addressed. For the last question: "After answering the questions, do you consider it important and necessary to discuss and seek knowledge on the subject?", 95% (n=19) of the corresponding professionals believe it is important and necessary to discuss and seek knowledge on the subject.

**Tabela 9-** Nível de conhecimento dos profissionais em relação ao vírus HTLV, Paraná, 2023.

Questions	Participants	
	n	%
<b>Do you know or have you heard about HTLV?</b>		
Yes	20	61
No	13	39
<b>How did you find out about HTLV?</b>		
In the day-to-day work	3	15
During academic training or technical course	10	50
Participated in educational actions about the disease	0	0
Television or internet	6	30
Other	1	5
<b>Do you know the ways of transmission?</b>		
I don't know	1	5
Unprotected sexual intercourse	19	95
Contact with sweat	0	0
By means of droplets	0	0
<b>These are diseases that can affect HTLV carriers, except:</b>		
I don't know	3	15
Myelopathy (HAM)	0	0
Lymphoma/Leukemia (ATLL)	4	20
Kaposi's sarcoma	13	65
<b>What are the forms of diagnosis?</b>		
I don't know	0	0
Blood test	20	100
Gynecological examination	0	0
Sputum test	0	0
<b>Regarding the treatment, check:</b>		
I don't know	2	10
Performed with antivirals	6	30
Antibiotics	0	0
Immunosuppressants	2	10
There is no specific treatment	10	50
<b>These are forms of prevention, with the exception of:</b>		
I don't know	1	5
Use of condoms	5	25
Vaccination	14	70
Use of disposable syringes and needles	0	0

<b>What was your biggest difficulty in caring for HTLV patients?</b>		
Ignorance	1	5
Lack of specific training	1	5
Absence of symptoms	1	5
Topic little addressed	1	5
I had no difficulties	16	80
<b>After answering the questions, do you think it is important and necessary to discuss and seek knowledge on the subject?</b>		
Yes	19	95
No	1	5

## Conclusion

This study showed a significant increase in the signs and symptoms of anxiety during the COVID-19 pandemic, directly impacting the eating behavior of students. The university students increased the consumption of processed foods, especially sugary and fatty foods, in times of anxiety. There were significant changes in the consumption pattern, highlighting the increase in ultra-processed foods, fast food, and alcoholic beverages, with potential consequences for body weight.

Regarding nutritional status, an average weight gain was observed, indicating a change in the conditions prior to the pandemic. The percentage of underweight students decreased, while the conditions of normal weight, overweight and obesity increased among students.

The results highlight the importance of the nutritionist's role in guiding food choices, aiming at a healthy diet to maintain the immune system and control anxiety symptoms.

## Acknowledgement

This study was funded by the authors themselves.

## References

1. OMS. Organização Mundial da Saúde. COVID - 19. 2020. Disponível em:< <https://www.who.int/pt> >. Acesso em: 15 set. 2021.
2. BRASIL. Ministério da Saúde. O que é o COVID-19. 2021. Disponível em:< <https://www.gov.br/saude/pt-br/coronavirus/o-que-e-o-coronavirus> >. Acesso em: 20 set. 2021.
3. ARAUJO, V.M.M; BAHOUTH, V.S.M. Influência da Ansiedade e Estresse no Comportamento Alimentar de Universitários em Tempos de Pandemia. Centro Universitário de Brasília – CEUB faculdade de ciências da educação e saúde Curso de nutrição. Brasília, 2021, 23 p.
4. FIOCRUZ. Fundação Oswaldo Cruz. Saúde Mental e Atenção Psicossocial na Pandemia COVID-19. A quarentena do COVID-19: Orientações e Estratégias de Cuidado. Ministério da Saúde. 2020, 15 p.

5. FONAPRACE. Fórum Nacional de Pró-Reitores de Assuntos Comunitários e Estudantis. Brasília, 2018, 318p.
6. VAZ, D. S. S., & BENNEMANN, R. M. Comportamento alimentar e Hábito alimentar: uma revisão. *Revista UNINGÁ Review*. 2014. 20(1), 112 p.
7. CLARO, R. M. et al. ... Patrícia Constante et al. Perfil nutricional da dieta no Brasil. *ev Saúde Pública* 2015;49:38.
8. RODRÍGUEZ-MARTÍN, B. C.; MEULE, A. Food craving: new contributions on its assessment, moderators, and consequences. *Front Psychol*. 2015, v. 6, p. 21.
9. MA, Y; ZHAO, W; LIU, J; HE, X; W, B; FU, S; YAN, W; NIU, J; ZHOU, J; LUO, B. Effects of temperature variation and humidity on the death of COVID-19 in Wuhan, China. *Rev. Science of The Total Environment*. 2017, 7 p.
10. MUSCOGIURI, G. et al. Nutritional recommendations for CoVID-19 quarantine. *European Journal of Clinical Nutrition*, [S.l.], 2020.
11. YOLMAZ, C. & GÖKMEN, V. Neuroactive compounds in foods: occurrence, mechanism and potential health effects. *Food Res*. 2020, v. 128.
12. WU, C. et al. Risk factors associated with acute respiratory distress syndrome and death in patients with coronavirus disease. *Pneumonia in Wuhan, China. JAMA Intern Med*. 2020.
13. QUALIBEST. Galunion. Alimentação na Pandemia como a COVID-19 impacta os consumidores e os negócios em alimentação. 2020, 52 p.
14. CARVALHO. L. O aumento do consumo de álcool em tempos de pandemia. 2020, 50 f.
15. BARROS, M.S.M.R; COSTA, S.M. Perfil do consumo de álcool entre estudantes universitários. *SMAD, Rev. Eletrônica Saúde Mental Álcool Drog*. 2019 Jan.-Mar.;15(1):4-13.
16. RENOVATO, H.P.C; LARAICH, O.A. Perfil socioeconômico dos estudantes de administração oriundos da rede pública de ensino. 2021, 23 p.
17. IBOPE. Pesquisa de opinião pública sobre vegetarianismo. 2018. Disponível em: [https://www.svb.org.br/images/Documentos/JOB\\_0416\\_VEGETARIANISMO.pdf](https://www.svb.org.br/images/Documentos/JOB_0416_VEGETARIANISMO.pdf)  
Acesso em: 16 mai. 2022.
18. SCARPONI, A.P; SANTOS, N.Q; OLIVEIRA, D.V; BERTOLINI, S. Alterações comportamentais em saúde, ansiedade e sintomas depressivos em pessoas sob isolamento social na pandemia da COVID-19. *Anais Eletrônico XII EPCC UNICESUMAR - Universidade Cesumar*. 2021.
19. UNIMAM. Site. 2020. Disponível em: <https://unimam.com.br/institucional/a-unimam/>  
. Acesso em: 10 abr.2022.
20. MAYNARD, D.C; ANJOS, H.A; MAGALHÃES, A.C.V; GRIMES, L.N; COSTA, M.G.O; SANTOS, R.B. Food consumption and anxiety among the adult population during the COVID-19 pandemic in Brazil. *Health Sciences*. 2021, vol. 9 nº. 11.
21. PECHINIM, I; BARBOSA, G.A.S; WERNECK, A.L. Ansiedade e depressão no contexto da pandemia COVID- 19 e a relação com os mecanismos de defesa das gestantes. *Research, Society and Development*. 2021, v. 10, n. 10.



22. BORGES, R.F. Mudança de Hábitos Alimentares Durante a Pandemia de COVID-19. Trabalho de Conclusão de Curso. Universidade Federal de Goiás. Goiânia. 2020, 33 p.
23. BICALHO, E.; VIEIRA, B. B. T. Avaliação do consumo alimentar durante o COVID-19. *Jornal de Investigação Médica*, v. 1, 2021.
24. IBOPE. Pesquisa de opinião pública sobre vegetarianismo. 2018. Disponível em: <https://www.svb.org.br> Acesso em: 16 mai. 2022.
25. ROCHA, S; FONSECA, T; FREITAS, L; ROCHA, L.M; MACEDO, M.T.S; OLIVEIRA, S; FRANÇA, D.S; CALDEIRA, L; POPOFF, L. Fatores associados ao aumento do consumo de alimentos ultraprocessados em universitários durante o isolamento social - pandemia covid-19. *Revista Brasileira de Obesidade, Nutrição e Emagrecimento*. 2020.
26. SARTOR, M.T.Q. Um Estudo da relação entre a ansiedade e o estado nutricional dos militares de um pelotão de bombeiros localizado no sul Catarinense. Universidade do Extremo Sul Catarinense – UNESC. Curso de Nutrição. Criciúma, 2020, 120 p.
27. VERTICCHIO, D.F.R; VERTICCHIO, N.M. The impacts of social isolation about changes of eating behavior and weight gain during the COVID-19 pandemic in Belo Horizonte and metropolitan region, State of Minas Gerais, Brazil. 2020.

**Autor de correspondência**

Lara Canever  
Universidade do Extremo Sul Catarinense  
Avenida Universitária, 1105. CEP: 88806-000-  
Universitário. Criciúma, Santa Catarina, Brasil.  
[larantr@unesc.net](mailto:larantr@unesc.net)