

Influence of stress and anxiety on students' eating habits during the pandemic

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Abstract

The objective of this work was to analyze the influence of stress and anxiety on the eating habits of nutrition students during the COVID-19 pandemic, identifying how these mental disorders contributed to the consumption of some specific foods and associating them with the pandemic period. This is a quantitative, descriptive study, carried out during the second half of 2021, using nutrition students, of both sexes and aged over 18 years, and collection was done through Google Forms and sent via social networks (WhatsApp®). The sample consisted of 83 nutrition students, of which 96.4% (n=80) were female and 39.8% (n=33) were between 18 and 22 years old. Regarding eating habits, 75.9% (n=63) reported some change in their eating routine, 83.1% (n=69) reported a greater appetite or desire to consume high-calorie foods and 81.9% (n= 68) stated that the stress or anxiety of social isolation may have influenced their food choices. These results are perfectly understandable, given the stressful and anxiolytic environment caused by social isolation, showing that such food choices do not depend on the individual's level of education or even course, but on a set of factors. Likewise, one cannot ignore the fact that many reported difficulties in relaxing, discouragement and sadness during the pandemic period, conditions that favor the emergence of other diseases of a psychological nature. With that, stress and anxiety were identified as possible influencers of the food choices of the evaluated students.

Keywords: Eating behavior. Mental disorders. Nutrition. COVID-19.

INTRODUCTION

According to PAHO¹, COVID-19 is an infectious disease caused by the new Coronavirus, which was identified on December 31, 2019 in Wuhan, China, for the first time. It has already led to the death of, during the pandemic, more than 2.5 million people around the world. COVID-19 has had repercussions not only on biomedical and epidemiological issues on a global level, but has also had social,

economic, political, cultural, and historical impacts never seen before². In this context, the literature points to a change in people's general behavior, which is also reflected in eating behavior. This seems to be associated with the restrictions established as a result of the pandemic and social isolation³.

Some forms of discomfort are common in situations of isolation, such as feelings of bo-

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redom, loneliness, various fears, and impotence, which can lead to changes in appetite and sleep⁴. Feelings such as sadness, depression, anxiety, low self-esteem, joy, and motivation can positively or negatively interfere with eating behavior⁵.

Social isolation causes sociocultural changes, little willingness to practice physical activities, and changes in consumption and eating habits, important indicators in determining the nutritional status. Evidence has shown that eating habits are also influenced by stress conditions and emotional disturbances, in which high levels are

associated with poor diet quality⁶.

University students are a group susceptible to poor eating habits and a sedentary lifestyle; allied to this, the need for isolation also promotes changes in eating behaviors. Currently, this public is characterized by sedentary lifestyle and unbalanced eating habits, with excessive consumption of foods with high-energy densities⁷.

Given the above, the objective of this work is to evaluate the impact of stress and anxiety on the eating habits of nutrition students during the COVID-19 pandemic.

METHODS

This is a cross-sectional, quantitative, descriptive study, with nutrition students aged over 18 years, of both sexes, in any semester of the course, who agreed to participate in the research through the Informed Consent Form (ICF). There was no exclusion criteria among nutrition students, allowing everyone to participate. The research was carried out between September and October 2021, the collection instrument used was an online questionnaire, prepared by the academic researcher, with 12 closed questions and two open ones (these having their results compiled for a better understanding), carried out through the Google Forms platform, in an objective and easy-to-understand manner.

The questionnaire was sent via social media (WhatsApp®, Facebook® and Instagram®) to groups that only contained nutrition students or privately to individuals identified by the researchers as students of the course in question. However, it cannot be guaranteed that all participants were exclusively students of the nutrition course. General data of the participants (age, education, and gender) and

information related to dietary issues were collected, such as: types of food consumed (homemade food, healthy food, fast foods, and high-calorie foods) and eating routine during the pandemic. On issues related to the influence of social isolation during the COVID-19 pandemic, issues related to changing habits caused by stress and anxiety were addressed, based on the questionnaire applied in the study by Maia and Dias⁸, which assessed anxiety and depression in university students during the COVID-19 pandemic.

Data were tabulated using Excel® software, version 2013, and analyzed using descriptive and inferential statistics, at a significance level of 5%. Statistical analysis was performed using the Statistical Package for Social Science software, version 26.0 (SPSS). Continuous variables were described by mean and standard deviation and categorical variables by absolute and relative frequencies. To identify the association between categorical variables, the chi-square test was used. This study was approved by the Ethics and Research Committee of Feevale University under opinion number 4.859.148.

RESULTS

In the present study, the eating habits of 83 nutrition students during the COVID-19 pandemic were analyzed. Regarding the results found, it was observed that 96.4% (n=80) of the individuals were female, with the predominant age group being between 18 and 22 years old (39.8%; n=33). As for the semester of the course, it was identified that most were divided between the 4th and 6th semesters 44.6% (n=37) and the 7th and 9th semesters 48.2% (n=40), as observed in Table 1.

When assessing the students' eating habits, 75.9% (n=63) reported some change in their eating routine. Among these, 27% (n=17) opted for more caloric foods and 23.8% (n=15) reported losing their eating routine. Of the individuals who reported having opted for higher-calorie foods, 42.2% (n=35) responded that they had been more attentive to their food choices during the pandemic, while 36.1% (n=30) revealed that they had not been as concerned with their diet; as shown in Table 2.

Regarding the source of food preparation before and during the pandemic, the option of homemade food remained above 80%, with 81.9% (n=68) before and 80.7% (n=67) during the same period. As for the consumption of fast-food or quick snacks, there was an increase in consumption, since before the pandemic only 1.2% (n=1) reported having this habit and during it was 10.8% (n=9) of respondents. In the question that mentioned the type of food most consumed during the pandemic period, the most caloric options, which included pizza, French fries, chocolates, and desserts in general, accounted for 54.2% (n=45) of the responses, while only 21.7% (n=18) reported having opted for healthier foods, such as fruits and vegetables. Overall, 83.1% (n=69) reported having had

on at least one occasion during the pandemic a greater appetite or desire to consume high-calorie foods (snacks, chocolates, or soft drinks), 39.8% (n=33) reported weight gain, and 30.1% (n=25) lost weight. Of the assessed sample, 43.4% (n=36) reported that the amount of food consumed by them increased. These data can be seen in Table 3.

In questions referring to the psychological aspects caused by social isolation, 71.1% (n=59) reported that, on at least one occasion during the pandemic, they felt anxious and of these, 51.3% (n=40) stated that this episode of anxiety was of medium intensity. Still within the psychological issues, 47% (n=39) said they had difficulty relaxing "sometimes". According to the question that asked if at any time during the pandemic period the students had felt discouraged or sad, 59% (n=49) stated that they had often been in this condition. In the question regarding the influence of stress or anxiety, resulting from social isolation, on food choices, 81.9% (n=68) answered affirmatively, as shown in Table 4.

When relating stress or anxiety to changes in eating routine, no statistically significant association was found ($p=0.153$); however, 73% (n=46) of individuals who identified themselves as anxious during the pandemic period reported changes in eating routine. Likewise, no association was identified between stress and anxiety and increased concern about the food consumed ($p=0.174$). However, it is worth noting that 34.3% (n=12) of students who claimed to be stressed were more attentive to their food choices.

Although no association was observed between the source of food preparation (home cooking or fast food), before and during the pandemic, with stress and/or anxiety ($p=0.432$), 100% (n=9) of anxious students

reported having opted for fast-foods or quick snacks. There was also no association between stress and anxiety and the consumption of high-calorie foods ($p=0.294$), but it should be noted that 75.6% ($n=34$) of those surveyed who reported anxiety opted for high-calorie foods.

When analyzing the association between self-perception of stress and/or anxiety with increased appetite for high-calorie foods, individuals who did not perceive themselves to be stressed or anxious did not increase their appetite for high-calorie foods ($p=0.026$), as

shown in Graph 1.

Regarding weight gain during the pandemic, 75.8% ($n=25$) of those who reported having gained weight during the period reported anxiety ($p=0.902$). It should be noted that 72.2% ($n=26$) of those who reported anxiety increased the amount of food consumed, but no statistical association was identified ($p=0.542$). With regards to the students' academic semester, 81.1% ($n=30$) of those who were between the 4th and 6th semester and 65% ($n=26$) between the 7th and 9th semester perceived themselves as anxious.

Table 1 – Profile of the studied population ($n = 83$). Novo Hamburgo, RS, 2021.

Variable	n	%
Sex		
Female	80	96.4
Male	3	3.6
Age Group		
18 - 22 years	33	39.8
23 - 26 years	19	22.9
27 - 31 years	10	12.0
32 - 35 years	10	12.0
36 - 60 years	11	13.3
Semester		
1 st to 3 rd Semester	3	3.6
4 th to 6 th Semester	37	44.6
7 th to 9 th Semester	40	48.2
Graduated	3	3.6

Table 2 – Self-perception of dietary patterns during the COVID-19 pandemic (n = 83). Novo Hamburgo, RS, 2021.

Variable	n	%
Change in eating routine		
Yes	63	75.9
No	20	24.1
Reason for changing eating routine		
Switched to higher-calorie foods	17	27.0
Lost my eating routine	15	23.8
Increased the amount ingested	9	14.3
Start preparing my own meals	9	14.3
Stuck to a healthy eating routine	8	12.7
Decreased amount consumed	5	7.9
Perception of changing food choices		
I became more aware of my food choices	35	42.2
I didn't worry so much about my food	30	36.1
I kept my eating routine	16	19.3
Others (he fluctuated between worrying and not worrying so much about his diet)	2	2.4

Table 3 – Profile of changes in eating habits and weight (n = 83). Novo Hamburgo, RS, 2021.

Variable	n	%
Source of preparation before the pandemic		
Homemade food	68	81.9
Restaurant food	12	14.5
Others (fluctuated between 3 options, depending on the time of day)	2	18.0
Fast-food (quick snacks)	1	1.2
Source of preparation during the pandemic		
Homemade food	67	80.7
Fast-food (quick snacks)	9	10.8
Restaurant food	6	7.2
Others (fluctuated between more than one of the answers)	1	1.2
Increase in food consumption		
Hypercaloric foods (pizza, French fries, hamburgers, lasagna, barbecue, soda, chocolate, desserts)	45	54.2
Fruits, vegetables, salads in general, or did not alter consumption	18	21.7
Others (fluctuated between healthy options and increased intake)	20	24.1
Greater appetite for hypercaloric food		
Yes	69	83.1
No	14	16.9
Weight change		
I gained weight	33	39.8
I lost weight	25	30.1
No	25	30.1

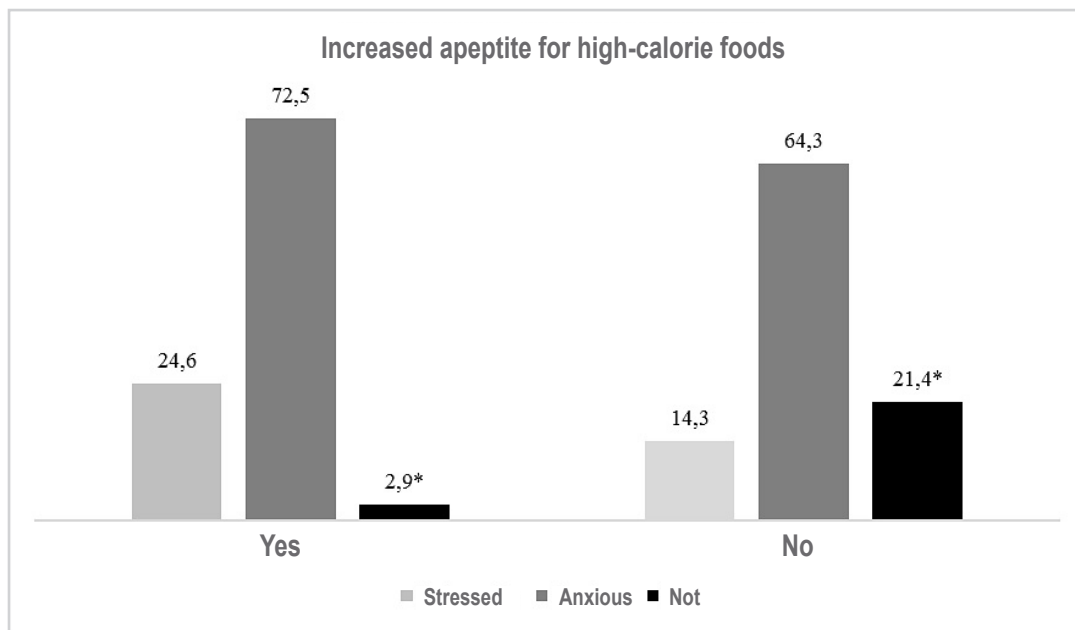
to be continued...

... continuation table 3

Variable	n	%
Amount of food ingested		
Increased	36	43.4
Stayed the same	32	38.6
Decreased	15	18.0

Table 4 – Self-perception of stress and/or anxiety during the COVID-19 pandemic (n = 83). Novo Hamburgo, RS, 2021.

QUESTIONS	n	%
How do students feel		
Anxious ^(a)	59	71.1
Stressed ^(a)	19	22.9
No	5	6.0
^(a) How intense was the episode		
Weak	14	17.9
Moderate	40	51.3
Strong	24	30.8
Difficulty relaxing		
Very few times	17	20.5
Sometimes	39	47.0
Oftentimes	27	32.5
Despondent/Sad		
Few times	34	41.0
Oftentimes	49	59.0
Stress/anxiety influenced choices		
YES, my choices were influenced	68	81.9
NO, my choices were not influenced	15	18.1



Graph 1 – Association of self-perceived stress and/or anxiety with increased appetite for high-calorie foods (in %, n=83, p=0.026). Novo Hamburgo, RS, 2021.

DISCUSSION

In the present study, most of the students reported changes in their eating routine during the COVID-19 pandemic, either because of schedules or because of choosing foods with higher caloric density. This is understandable, given the stress and anxiety caused by social isolation.

When analyzing the characteristics of the studied population, almost all of them were adult women (96.4%), studying from the first to the last semesters of their undergraduate degree. Among these, a portion (27%) revealed having opted for more caloric foods during the COVID-19 pandemic, showing that such a choice is independent of the individual's level of education, since a set of factors imply food choices. Corroborating these findings, Berti⁹ in his study that analyzed the food frequency of 520 individuals, randomly selected by gender,

education, and age, half of whom had completed higher education, identified that 27.5% of the highly educated sample had higher consumption of ultra-processed foods, concomitantly with a lower consumption of in natura, minimally processed foods and meals based on these foods. These results are similar to those found in the study in question, perhaps not concerning the sample since they were technical-administrative employees of university campuses in the state of Rio de Janeiro, but in the prevalence of those who opted for this type of food. The sample of the present study had only 3.6% of graduated individuals.

At the University of Porto, a study involving 137 students from the institution found something similar, revealing that 77.6% of the sample participants reported having had some change in their diet during the period of so-

cial isolation caused by the pandemic, either in the number of meals or of schedules⁷, which is a similar prevalence to the present study that observed a change in the respondents' eating routine (75.9%). On the other hand, the research conducted by Steele¹⁰ throughout the national territory, with a total of 10,116 participants, mostly female (78%) and people with 12 or more years of schooling (85.1%), demonstrated completely different findings. As they evaluated the consumption of healthy foods, such as fruits, vegetables and legumes, they concluded that there was an increase, even if modest, in the intake of these foods during the COVID-19 pandemic, while the consumption of the so-called unhealthy food remained stable in relation to the numbers prior to the pandemic period¹⁰, which is something that, as previously mentioned, is in contrast to the findings of the present study in terms of diet.

For researchers who studied 30 university students between 18 and 30 years of age at the Federal University of Triângulo Mineiro (UFTM), with the objective of evaluating the association between stress, eating behavior, and food consumption in university students, highlighted that the way in which the individual passes through stressful experiences determines their body's biological response and can even adapt according to other characteristics that may be physiological, psychological, or environmental. These aspects interact with each other to conceive different results between people, such as an increase in appetite, for example. In turn, foods high in fat and sugar generate positive emotions and pleasure, associating the memory of their consumption with the feeling of reward¹¹. It is possible that this process was experienced by the interviewees in the present study, since (83.1%) reported, on at least one occasion, a greater appetite for high-calorie foods (fast-food or desserts in general), considered comfort

foods, thus demonstrating that the appetite for these foods may not depend on knowledge about the subject, but on how the individual behaves in situations of extreme stress and anxiety, considering that the research in question was intended to be applied only to nutrition students.

Food delivery companies (deliveries) have not released consistent data on the impact of COVID-19 on sales. However, one of the main companies in this sector, for example, confirmed that there was an increase in demand for delivery following the spread of COVID-19 in Brazil¹². These data corroborate the information gathered in this research, as an increase in the consumption of fast-food-type foods (mostly delivered by these companies) was identified among individuals (10.8% of the sample). With regards to the type of food preparation, it was identified that most of the interviewees continued to prepare their own meals (80.7%), without making use of internet tools, such as food delivery apps, which is something classified as positive since they can make their own choices, looking for healthier options.

Concerning changes in the weight of those surveyed, it was identified that most students reported weight change, both gain (39.8%) and loss (30.1%). The same was observed in the NutriNet Brasil cohort study, which aimed to describe changes in the body weight of participants that occurred during the COVID-19 pandemic, which involved 14,259 participants of both sexes, over 18 years old, and with more than 12 years of schooling. For 85.6% of respondents, weight gain greater than or equal to 2 kg in 19.4% of the female sample of respondents¹³ was observed. On the other hand, the same study showed that there was weight loss greater than or equal to 2kg for 14.4% of the female subjects, with no significant association with their education¹³. Such results are similar to the present study, since the vast majority of them are women, with

higher education in progress, but it differs in terms of weight loss or gain, where the percentages were higher (30.1% and 39.8% % respectively).

As for questions related to stress and anxiety of the participants, most revealed moderate episodes of anxiety (51.3%). However, one cannot ignore the fact that many others mentioned difficulty in relaxing, discouragement, and sadness during the period of social isolation, conditions that favor the emergence of other psychological illnesses. With regards to the impact of stress and/or anxiety on food choices, most revealed that these feelings had an influence at these times (81.9%), and it should be noted that anxiety, in the evaluated sample, was more relevant than stress. This bringing to the discussion whether these factors alone would be decisive and sufficient for such changes in routine.

COVID-19 has brought a series of challenges that, perhaps due to the lack of experience, we were not able to face, considering that humanity had only learned about a pandemic in this proportion in books. However, psychological issues that lead to such food choices must be discussed and brought to everyone's knowledge, so that it is possible to understand a little more about human behavior in the face of these situations of extreme stress and anxiety. Some authors point out that it is possible to identify important emotional and psychological reasons for the emergence and evolution of obesity, which is why nutritional education actions are increasingly necessary in schools and universities (regardless of the course), so that even in situations of extreme pressure, an individual is able to opt for healthy foods over those considered hypercaloric, maintaining minimal vigilance on the consumption of these foods¹⁴.

A study consisting of two groups, one sample involving 460 individuals with an average

age of 20.14 years old and another with 159 individuals with an average age of 20.40 years old, which aimed to analyze whether the levels of depression, anxiety, and stress in university students changed in the pandemic period compared to previous periods, confirmed a significant increase in psychological disturbance (anxiety, depression, and stress) among them during the pandemic, when compared to a previous moment. The conclusion of the study was, however, that it cannot be assumed that the increase in levels of anxiety, depression, and stress is only due to the pandemic. Such conditions may have several other contributors (personality and/or perceived social support)[8]; therefore, in the present analysis, it cannot be stated that stress and anxiety were caused by the COVID-19 pandemic. Therefore, these psychological disorders cannot be held responsible for the increase in hypercaloric consumption by students, since the only relationship that had statistical significance was the one that related the lack of perception of anxiety and stress with the lack of appetite for hypercaloric foods.

Among the limitations of this study, we highlight the fact that the information described in the results was not properly measured, but informed by the research participants, which could create a body image distortion bias regarding weight gain or loss, as they were not weighed and also because there is no specific test for the level of stress or anxiety, leaving it up to the individual to self-evaluate and report how they were feeling at the time of the survey. Similarly, the selection of participants was made for convenience through their participation in social network groups, such as WhatsApp®, composed only of nutrition students, which brings with it the possibility of false information regarding the course of the questionnaire respondent, which cannot be measured by the researchers.

CONCLUSION

Stress and anxiety were mentioned by the students as possible influencers of food choices, thus causing a greater appetite and consequent increase in the consumption of hypercaloric foods, demonstrating that such behavior is independent of knowledge about the subject. Therefore, even though the study was aimed at nutrition students and those who know about the harmful effects of a diet rich in these foods, are first and foremost human beings and, as such, they may eventually have had their eating behavior or body image assessment affected by the pandemic.

Many supposedly opted for the well-being and comfort provided by hyperpalatable foods to the detriment of previously indispensable aspects, such as taking care of their own health. The consumption of these less beneficial foods seems to have been used as a means of esca-

ping from turbulent situations, a fact that may have been favored by the stress and anxiety generated by the decrease in coexistence between people caused by social isolation, even without a specific test that could measure the level of these disorders.

After this study's analyses, it was concluded that, according to their reports, most of the students surveyed increased their consumption of some type of high-calorie food, such as pizza, French fries, hamburgers, soft drinks, and desserts in general, which were listed as the main foods. A moment of great uncertainty and fear may have influenced eating behavior, in the form of unhealthy and more compensatory choices. This is why more studies on the subject will always be needed, in order to better understand the real impact of this pandemic on students, but mainly on society as a whole.

Author Statement CRediT

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Supplementary Material

DATA COLLECTION INSTRUMENT

*Gender: () Female () Male

*Age: _____

*Semester enrolled in the course: _____

1. Did the COVID-19 pandemic and the consequent social distancing somehow change your eating routine (whether in relation to food or eating routines)?

() Yes

() No

2. If you answered YES to the previous question, how has your eating routine changed?

Explain: _____

3. As a nutrition student, you are naturally more concerned about the food you consume. During the COVID-19 pandemic, did you notice any changes in this regard?

() I became more attentive to my food choices

() I didn't worry so much about my diet

() I maintained my eating routine

() Others: _____

4. What was the source of preparation of your food BEFORE THE COVID-19 pandemic?

() Homemade food

() Restaurant food (delivery)

() Fast-food (quick snacks)

() Others

5. What is the source or preparation of the food consumed by you DURING THE COVID-19 PANDEMIC?

() Homemade food

() Restaurants (delivery)

() Fast foods (quick snacks)

() Others

6. Analyze the foods listed below and mark those that, in your perception, increased consumption due to the COVID-19 pandemic: CHECK ONE OR MORE OPTIONS

() Pizza

() French fries

() Burger

() Lasagna

() Barbecue

() Soda

() Chocolate

() Desserts in general

() Fruits, vegetables and salads in general

() Others _____

7. Have you noticed or noticed, on any occasion, during social isolation, a greater appetite or desire to consume some high-calorie food (e.g. snacks, soda, chocolate, or others) that made you deviate from your usual dietary rhythm?

- Yes
- No

8. Have you noticed any changes in your usual weight (be it gain or loss) during the COVID-19 pandemic?

- I gained weight
- I lost weight
- No

9. Have you noticed any changes in the amount of food you eat daily during the pandemic?

- Remained the same
- Decreased
- Increased

10. Have you felt, on at least one occasion, stress and/or anxiety, due to the social distancing and consequent confinement caused by the COVID-19 pandemic?

- Stressed
- Anxious
- No

11. If in the previous question you reported that you had at least one episode of stress or anxiety, do you understand that it was:

- Weak
- Average
- Strong
- There was no episode

12. Have I ever had difficulty relaxing and calming down during social isolation?

- Very few times
- Sometimes
- Oftentimes

13. Have you ever felt discouraged and sad during the COVID-19 pandemic with the situation you were in?

- Never
- Few times
- Oftentimes

14. In view of this, do you understand that this stress or anxiety may have influenced your food choices during social isolation during the COVID-19 pandemic? Briefly explain.