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Association between eating behavior and weight gain in university students during the COVID-19 pandemic

Associação entre comportamento alimentar e ganho de peso em estudantes universitários na pandemia da COVID-19

Asociación entre el comportamiento alimentario y el aumento de peso en estudiantes universitarios en la pandemia de COVID-19

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Objective: to evaluate weight gain and associated factors in university students during the first wave of COVID -19. **Methods:** this is a cross-sectional study carried out in the first half of 2020, using an online semi-structured questionnaire with undergraduate students from a university in southeastern Brazil, analyzed using descriptive and inferential statistics. **Results:** 876 students were evaluated (age: median 22±5 years). Showing an increase in appetite increased the odds of weight gain by about 2.5 times, while changes in diet and worrying about weight gain doubled those odds. Obesity increased the odds of weight gain by 276%. On the other hand, higher scores on the "*Eating for physical and non-emotional reasons*" subscale of intuitive eating was associated with lower chances of students showing this gain. **Conclusion:** these data point to the need for strategies based on intuitive eating, to minimize the impacts of the pandemic on the eating behavior of university students.
Descriptors: Feeding behavior; Weight gain; Students; COVID-19.

Objetivo: avaliar o ganho de peso e fatores associados em estudantes universitários durante a primeira onda de COVID -19. **Método**: trata-se de um estudo transversal realizado no primeiro semestre de 2020, por meio de um questionário semiestruturado *online* com estudantes de graduação de uma universidade do Sudeste brasileiro, analisando-se por estatística descritiva e inferencial. **Resultados**: foram avaliados 876 estudantes (idade: mediana 22±5 anos). Apresentar aumento no apetite ampliou em cerca de 2,5 vezes as chances de ganho de peso, enquanto mudanças na alimentação e preocupar-se com o ganho de peso dobrou essas chances. A obesidade aumentou as chances de ganho de peso em 276%. Em contrapartida, maior pontuação na subescala "*Comer por razões físicas e não emocionais*" do comer intuitivo associou-se com chances menores dos estudantes apresentarem esse ganho. **Conclusão**: esses dados apontam a necessidade de estratégias baseadas em uma alimentação intuitiva para minimizar os impactos da pandemia no comportamento alimentar de estudantes universitários.
Descritores: Comportamento alimentar; Aumento de peso; Estudantes; COVID-19.

Objetivo: evaluar el aumento de peso y los factores asociados en estudiantes universitarios durante la primera ola de COVID -19. **Método:** se trata de un estudio transversal realizado en el primer semestre de 2020, por medio de cuestionario semiestructurado online con estudiantes de pregrado de una universidad del sudeste de Brasil, analizado por estadística descriptiva e inferencial. **Resultados:** Se evaluaron 876 estudiantes (edad: mediana 22±5 años). El aumento del apetito multiplicó por 2,5 las probabilidades de ganar peso, mientras que los cambios en la dieta y la preocupación por el aumento de peso duplicaron estas probabilidades. La obesidad aumentó las probabilidades de aumento de peso en un 276%. Por el contrario, las puntuaciones más altas en la subescala "*Comer por razones físicas y no emocionales*" de la alimentación intuitiva se asociaron con menores probabilidades de que los estudiantes experimentaran un aumento de peso. **Conclusión:** estos datos apuntan a la necesidad de estrategias basadas en la alimentación intuitiva para minimizar los impactos de la pandemia en el comportamiento alimentario de los estudiantes universitarios.
Descriptores: Conducta alimentaria; Aumento de peso; Estudiantes; COVID-19.

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INTRODUCTION

Entering university causes changes in lifestyle that have an important influence on the construction of body image and changes in eating habits. The new responsibilities and academic demands, social demands, the decrease in available time, the conquest of freedom, and social pressure can contribute to emotional imbalances in students, such as symptoms of stress, anxiety and depression[1].

Among the various stressors that can cause adverse health effects, not only for university students, but for society as a whole, those related to the COVID-19 pandemic currently stand out. On March 20, 2020, the World Health Organization (WHO) recognized COVID-19 as a pandemic that constituted a Public Health Emergency of international importance[2].

In the context of a pandemic, negative effects on mental health are generated due to fear of being infected by the virus, concern for family members, anxiety about being at home and having their daily routine changed, stress, frustration, lack of supplies, inadequate information, financial loss and stigma[3]. These factors have a direct impact on the population's health-disease process, negatively affecting healthy eating habits, which may result in a higher occurrence of obesity[4]. In a study carried out with university students, it was observed that, in two months of social distancing, the prevalence of overweight and obesity increased by 5% and 3%, respectively[5].

Unfavorable changes in eating can occur in response to these feelings, called “emotional eating”. As a consequence, feelings such as stress have been linked to increased energy intake, "cravings", unhealthy eating patterns high in fat and sugar, and increased alcohol consumption, which can lead to weight gain[6-7]. This gain can become permanent in some people and even lead to more weight gain in the future, increasing the risk of obesity, even more so if the unfavorable nutritional behaviors observed during social distancing are not reversed[6].

These dietary changes influenced not only by external factors, but also by the individual's internal ones, can be evaluated within a larger construct called intuitive eating, which is an adaptive way of eating, which is mainly characterized by a strong connection with physiological signs of hunger and satiety[8]. Studies have revealed that there is an inverse relationship between intuitive eating and emotional eating[9]. Several works also demonstrate an inverse association between intuitive eating and body mass index (BMI)[10-11]. In this way, intuitive eating could play a protective role against the negative impact on eating by external factors, such as the consequences arising from the COVID-19 pandemic.

This work is based on the assumption that COVID-19 had a negative impact on university students, acting as a stressor that changed students' eating behavior, resulting in weight gain. Thus, this study aimed to evaluate weight gain and associated factors in university students during the first wave of COVID-19.

METHODS

This is a cross-sectional study, in which undergraduate students from a federal university in Southeastern Brazil (state of Espírito Santo) participated in the research. All academics over 18 years of age, of both sexes, regularly enrolled in face-to-face courses on any of the university's four *campuses* were invited to participate. Recruitment was carried out through institutional email (intermediated by the university) and dissemination through academic centers and social networks. Pregnant and lactating women were excluded from the study because changes in eating behavior were expected at these stages of life.

Data collection was carried out from May to June 2020, during the first wave of the COVID-19 pandemic. The online questionnaire was applied, with self-reported information. Initially, the participants informed the sociodemographic data: gender; age; marital status; with whom you reside; race/skin color[12]; family income in number of minimum wages; and education of the head of the family.

Then they provided information about academic data: *campus*, course they were enrolled in and term - which they took the highest number of disciplines. Regarding social distancing, they reported whether there had been flu-like signs/symptoms recently and whether they had stayed at home in the last month. About life habits, they were questioned about the intake of alcohol, tobacco and practice of physical activity. In addition, appetite was evaluated (appetite preserved, decreased or increased), if there were changes in diet and if they followed fitness/health social media.

To assess body perception and satisfaction, the silhouette scale developed for assessing Brazilian children and adults of both genders, validated for digital use by Freire and Fisberg[13], was used. The participants were also asked about diet practices and the presence of weight concerns.

Intuitive eating was assessed by applying the “Intuitive Eating Scale - 2”, developed by Tylka and Kroon Van Diest[10] and translated into Brazilian Portuguese by Da Silva et al[14]. This scale consists of questions about eating attitudes involving intuitive eating[15]. The analysis is performed

using the total score, obtained from the average of all questions, and the higher the score, the higher the level of intuitive eating.

Its four subscales (dimensions) are also evaluated: Unconditional permission to eat (UPE), which reflects the willingness of individuals to eat when they are hungry and not to label foods as prohibited; Eating for physical rather than emotional reasons (EPR), where the act of eating occurs when they are physically hungry rather than to deal with emotional issues. Reliance on hunger and satiety cues for eating (RHSC), which reflects individuals' reliance on their internal hunger and satiety cues to guide their eating behavior; and the Congruence between body needs and food choices (B-FCC), which considers the tendency of individuals to make choices that respect their health and body functioning[10].

Current weight (kg) and height (cm) were self-reported. The calculation of BMI was calculated by dividing weight by height squared, and classified according to the criteria of the World Health Organization[16]. Information on weight gain (last month) was also obtained, categorized as “No” and “Yes”, which is the dependent variable of the study (outcome).

The sample calculation was performed using the Openepi™ online software, considering the prevalence of weight gain in the COVID-19 quarantine (53.7%)[17], with a significance level of 95% and a sampling error of 5%, resulting in the need to from a minimum sample of 375 individuals.

Data were analyzed using IBM SPSS Statistics for Windows software, version 22.0 (Armonk, NY: IBM Corp). The normality of variables was assessed using the Shapiro-Wilk test. To describe the study variables, medians (with interquartile range) or absolute and relative frequencies were used. For the analysis of differences between medians, the Mann-Whitney test was used, and for differences in proportions, the Chi-square (X^2) or Fisher's exact test was used. The significance level for all tests was 5%.

To quantify the participation of independent variables in the outcome of interest, multivariate analysis was performed, including in the binary logistic regression model the independent variables that presented a significance level of up to 20% in the bivariate tests. The assumption of absence of multicollinearity and the adjustment of the model according to the Hosmer-Lemeshow test were also considered. Odds ratio values and their respective confidence intervals were estimated.

The research was submitted to the Research Ethics Committee (CEP) of the institution and approved according to Opinion No. 4,022,658, of May 12, 2020 (CAAE: 30348620.5.0000.5060) and No. 4,080,199, of June 9, 2020 (CAAE: 30348620.5.0000.5060).

RESULTS

A total of 876 students were evaluated, most of whom were female (No=647; 73.9%), who did not live with a partner, lived with their family and were white, head of household had a Higher Education/Post-graduation degree and family income between 2 and 5 minimum wages. The median age of students was 22±5 years (Table 1).

Regarding academic data, most were enrolled on *campus* 2, (No=489; 55.8%) in courses that were not in the health area (No=568; 64.8%). When asked about adhering to social distancing, 610 (69.6%) reported having stayed completely at home. Most reported not having shown flu-like signs and symptoms. Regarding life habits, most reported drinking alcohol and practicing physical activity, as opposed to tobacco use (reported by a minority of participants) (Table 1).

It is also verified that, although most of them reported preserved appetite, changes in food in general were reported (with examples of changes being the frequent consumption of sweets and changing main meals for snacks - data not shown). Among the behavioral variables, the concern with weight gain, inadequate body perception and the predominant presence of body dissatisfaction stood out. Most participants had a nutritional status of eutrophy (No=493; 56.3%), and weight gain in this initial period of social distancing was reported by 45.7% of the total number of students (No=400) (Table 1).

In Table 2, the sociodemographic and academic data distributed according to the students' weight gain can be seen. It is observed that age (p=0.002) and marital status (p=0.001) were associated with weight gain.

Table 1. Sociodemographic, academic, social distancing, lifestyle, eating, behavioral and anthropometric data of undergraduate students at a federal university in Southeastern Brazil. Vitória/ES, 2020.

Variables	No	%
Sex		
Male	229	26.1
Female	647	73.9
Age (years)*	22 ± 5	
Marital status		
Does not have a partner	779	88.9
Has a partner	97	11.1
Live with		
Family	646	73.7
Alone	79	9.1
Student residence or with friends	151	17.2
Race/Skin color[1]		
White	412	48.4
Black	114	13.4
Pardo (mixed race)	325	38.2
Educational level of the head of the family		
None/Elementary Education	197	22.5
High School Education	330	37.7
Higher Education/Postgraduate	349	39.8
Family income[2]		
< 1 MW	94	11.6
Between 1 and 2 MW	271	33.5
More than 2 and up to 5 MW	287	35.4
> 5 MW	158	19.5
Campus		
Campus 1	236	26.9
Campus 2	489	55.8
Campus 3	82	9.4

Campus 4	69	7.9
Area		
Health	308	35.2
Not Health	568	64.8
Term		
First half	516	58.9
Second half	360	41.1
Stayed at family home		
No	26	3.0
Yes, partially	240	27.4
Yes, completely	610	69.6
Flu-like symptoms		
No	663	75.7
Yes	213	24.3
Alcohol consumption		
No	361	41.2
Yes	457	52.2
In the past	58	6.6
Smoking habit		
No	774	88.4
Yes	59	6.7
In the past	43	4.9
Physical activities		
No	374	42.7
Yes	502	57.3
Appetite		
Preserved	398	45.4
Decreased	151	17.3
Increased	327	37.3
Change in eating habits		
No	350	40.0
Yes	526	60.0

Follows fitness/health media		
No	548	62.6
Yes	328	37.4
Diet practice		
No	558	63.7
Yes	318	36.3
Worries about weight		
No	240	27.4
Yes (fear of gaining weight)	549	62.7
Yes (fear of losing weight)	87	9.9
Body perception		
Adequate	133	15.2
Inadequate	743	84.8
Body dissatisfaction		
No	93	10.6
Yes	783	89.4
Intuitive eating - Total score IES-2*	3.39 ± 0.74	
Intuitive eating - Subscale UPE*	3.83 ± 1.00	
Intuitive eating - Subscale EPR*	3.13 ± 1.25	
Intuitive eating - Subscale RHSC*	3.33 ± 1.16	
Intuitive eating - Subscale B-FCC*	3.67 ± 1.0	
BMI(Kg/m²)*	23.0 ± 5.9	
BMI classification		
Low eight	82	9.4
Eutrophy	493	56.3
Overweight	192	21.9
Obesity	109	12.4
Gained weight		
No	476	54.3
Yes	400	45.7

*Data expressed as p50 ± interquartile range (IQR). N=876; 1N = 851; 2N = 810. Asian/indigenous were treated as missing data. MW: Minimum wages. BMI: Body Mass Index. B-FCC: Body-Food-Choice Congruence. EPR: Eating for physical rather than emotional reasons. IES: Intuitive Eating Scale. RHSC: Reliance on hunger and satiety cues. UPE: Unconditional permission to eat.

Table 2. Sociodemographic and academic data distributed according to the weight gain of undergraduate students at a university in southeastern Brazil. Vitória/ES, 2020.

Variables	Weight gain		p-value	Total
	No	Yes		
	No (%)	No (%)		No (%)
Sex[a]			0.397	
Male	130 (27.3)	99 (24.8)		229 (26.1)
Female	346 (72.7)	301 (75.2)		647 (73.9)
Age (years)*[b]	22 ± 4	22 ± 6	**0.002**	22 ± 5
Marital status[a]			**0.001**	
Does not have a partner	438 (92.0)	341 (85.2)		779 (88.9)
Has a partner	38 (80)	59 (14.8)		97 (11.1)
Lives with			0.415	
Family	349 (73.3)	297 (74.2)		646 (73.7)
Alone	39 (8.2)	40 (10.0)		79 (9.1)
Student residence or friends	88 (18.5)	63 (15.8)		151 (17.2)
Race/skin color[1]			0.478	
White	231 (50.2)	181 (46.3)		412 (48.4)
Black	55 (12.0)	59 (15.1)		114 (13.4)
Pardo (mixed raced)	174 (37.8)	151 (38.6)		325 (38.2)
Educational level of head of family			0.052	
None/Elementary education	112 (23.5)	85 (21.2)		197 (22.5)
High School education	162 (34.0)	168 (42.0)		330 (37.7)
Higher Education/Postgraduate	202 (42.5)	147 (36.8)		349 (39.8)
Family income[2]			0.198	
< 1 MW	47 (10.7)	47 (12.7)		94 (11.6)
Between 1 and 2 MW	138 (31.4)	133 (35.8)		271 (33.5)
More than 2 and up to 5 MW	158 (36.0)	129 (34.8)		287 (35.4)
> 5 MW	96 (21.9)	62 (16.7)		158 (19.5)
Campus			0.111	
Campus 1	120 (25.2)	116 (29.0)		236 (26.9)
Campus 2	262 (55.0)	227 (56.8)		489 (55.8)

Campus 3	54 (11.4)	28 (7.0)		82 (9.4)
Campus 4	40 (8.4)	29 (7.2)		69 (7.9)
Area[a]			0.887	
Health	166 (34.9)	142 (35.5)		308 (35.2)
Not Health	310 (65.1)	258 (64.5)		568 (64.8)
Term[a]			0.945	
First half	281 (59.0)	235 (58.8)		516 (58.9)
Second half	195 (41.0)	165 (41.2)		360 (41.1)

Chi-square Test. aFisher's exact test. bMann-Whitney test. *Data expressed as p50 ± interquartile range (IQR). N=876; 1N = 851; 2N = 810. Oriental (yellow)/indigenous were treated as missing data. SM: Minimum wages.

In Table 3, the data related to social distancing, life and eating, behavioral and anthropometric habits can be seen, distributed according to the students' weight gain. This gain was associated with increased appetite, changes in diet (p<0.001 in both variables), diet practices (p=0.029), fear of gaining weight (p<0.001), inadequate body perception (p=0.030) and presence of body dissatisfaction (p=0.001).

It was also observed that both the total intuitive eating score and the EPR, RHSC and B-FCC subscales were significantly lower among those who gained weight, indicating that eating in a less intuitive way may be associated with weight gain. weight in these students. The data in this table also indicate that, although a higher BMI is observed among those who gained weight, eutrophy predominates among individuals who gained weight.

In the multiple analysis by binary logistic regression (Table 4), it is observed that having an increased appetite increased by almost 2.5 times the chances of individuals having weight gain (OR=2.495; CI=1.733-3.592; p<0.001). The presence of changes in diet practically doubled the chances of students having this gain (OR=1.939; CI=1.380-2.724; p<0.001), as well as worrying about weight gain (OR=1.750; CI=1.161- 2.638; p=0.008), which increased these chances by 75%. The intuitive eating EPR subscale remained associated with weight gain, but exerting a protective effect, since it reduced the chances of this gain in students by 22% (OR=0.781; CI=0.632-0.966; p=0.023). Being already obese increased these chances by 2.76 times (OR=2.759; CI=1.165-6.533; p=0.021).

Table 3. Data related to social distancing, living, eating, behavioral and anthropometric habits distributed according to weight gain in undergraduate students at a federal university in southeastern Brazil. Vitória/ES, 2020.

Variables	Weight gain		p-value	Total
	No	Yes		
	No (%)	No (%)		No (%)
Stayed at family home			0.696	
No	14 (2.9)	12 (3.0)		26 (3.0)
Yes, partially	136 (28.6)	104 (26.0)		240 (27.4)
Yes, completely	326 (68.5)	284 (71.0)		610 (69.6)
Flu-like symptoms			0.813	
No	362 (76.1)	301 (75.2)		663 (75.7)
Yes	114 (23.9)	99 (24.8)		213 (24.3)
Alcohol consumption			0.219	
No	208 (43.7)	153 (38.2)		361 (41.2)
Yes	240 (50.4)	217 (54.3)		457 (52.2)
In the past	28 (5.9)	30 (7.5)		58 (6.6)
Smoking habit			0.951	
No	422 (88.7)	352 (88.0)		774 (88.4)
Yes	31 (6.5)	28 (7.0)		59 (6.7)
In the past	23 (4.8)	20 (5.0)		43 (4.9)
Physical activities			0.055	
No	189 (39.7)	185 (46.2)		374 (42.7)
Yes	287 (60.3)	215 (53.8)		502 (57.3)
Appetite			**<0.001**	
Preserved	261 (54.8)	137 (34.2)		398 (45.4)
Decreased	101 (21.2)	50 (12.5)		151 (17.3)
Increased	114 (24.0)	213 (53.3)		327 (37.3)
Change in eating habits			**<0.001**	
No	232 (48.7)	118 (29.5)		350 (40.0)
Yes	244 (51.3)	282 (70.5)		526 (60.0)
Follows fitness/health media			0.234	

No	289 (60.7)	259 (64.8)		548 (62.6)
Yes	187 (39.3)	141 (35.2)		328 (37.4)
Diet practice			**0.029**	
No	319 (67.0)	239 (59.8)		558 (63.7)
Yes	157 (33.0)	161 (40.2)		318 (36.3)
Worries about weight			**<0.001**	
No	170 (35.7)	70 (17.5)		240 (27.4)
Yes (fear of gaining weight)	239 (50.2)	310 (77.5)		549 (62.7)
Yes (fear of losing weight)	67 (14.1)	20 (5.0)		87 (9.9)
Body perception			**0.030**	
Adequate	84 (63.2)	49 (36.8)		133 (15.2)
Inadequate	392 (52.8)	351 (47.2)		743 (84.8)
Body dissatisfaction			**0.001**	
No	66 (13.9)	27 (6.8)		93 (10.6)
Yes	410 (86.1)	373 (93.2)		783 (89.4)
Intuitive eating - Total score IES-2*	3.52 ± 0.72	3.30 ± 0.72	**<0.001**	3.39 ± 0.74
Intuitive eating - Subscale UPE*	3.83 ± 0.84	3.67 ± 0.83	0.074	3.83 ± 1.00
Intuitive eating - Subscale EPR*	3.38 ± 1.25	3.00 ± 1.25	**<0.001**	3.13 ± 1.25
Intuitive eating - Subscale RHSC*	3.33 ± 1.17	3.17 ± 1.16	**0.001**	3.33 ± 1.16
Intuitive eating - Subscale B-FCC*	3.67 ± 1.00	3.33 ± 1.00	**0.010**	3.67 ± 1.00
BMI(Kg/m²)*	22.1 ± 5.1	24.3 ± 7.0	**<0.001**	23.0 ± 5.9
BMI classification			**<0.001**	
Low eight	62 (13.0)	20 (5.0)		82 (9.4)
Eutrophy	291 (61.2)	202 (50.5)		493 (56.3)
Overweight	89 (18.7)	103 (25.8)		192 (21.9)
Obesity	34 (7.1)	75 (18.7)		109 (12.4)

Chi-square Test. aFisher's exact test. bMann-Whitney test. *Data expressed as p50 ± interquartile range (IQR). N = 876. B-FCC = Body-Food-Choice Congruence. EPR = Eating for physical rather than emotional reasons. IES = Intuitive Eating Scale. RHSC = Reliance on hunger and satiety cues (Reliance on hunger and satiety to eat). UPE = Unconditional permission to eat.

Table 4. Multiple analysis of the presence of weight gain in undergraduate students at a federal university in southeastern Brazil. Vitória/ES, 2020..

Variables	Gross				Adjusted			
	p value	OR	CV95%		p value	OR	CV95%	
			Inferior	Superior			Inferior	Superior
Age	**0.017**	**1.022**	**1.004**	**1.040**	0.510	1.008	0.985	1.032
Marital status								
Does not have a partner		1				1		
Has a partner	**0.002**	**1.994**	**1.295**	**3.070**	0.135	1.515	0.878	2.615
Educational level of head of family								
None/Elementary education		1				1		
High School education	0.816	1.043	0.733	1.484	0.120	1.397	0.916	2.132
Higher education/Postgraduate	**0.022**	**1.425**	**1.053**	**1.929**	0.595	1.134	0.714	1.801
Family income								
< 1 MW		1				1		
Between 1 and 2 MW	0.096	1.548	0.925	2.592	0.663	1.125	0.661	1.915
More than 2 up to 5 MW	**0.049**	**1.492**	**1.002**	**2.223**	0.695	0.897	0.522	1.542
> 5 MW	0.245	1.264	0.852	1.877	0.444	0.782	0.417	1.467
Campus								
Campus 1		1				1		
Campus 2	0.490	0.896	0.657	1.223	0.653	1.090	0.750	1.583
Campus 3	**0.020**	**0.536**	**0.318**	**0.905**	0.075	0.557	0.293	1.060
Campus 4	0.298	0.750	0.436	1.289	0.275	0.700	0.369	1.328
Physical activity								
No		1				1		
Yes	0.051	0.765	0.585	1.002	0.245	0.820	0.587	1.146
Appetite								
Preserved		1				1		
Decreased	0.773	0.943	0.634	1.403	0.683	1.102	0.692	1.754
Increased	**<0.001**	**3.560**	**2.618**	**4.841**	**<0.001**	**2.495**	**1.733**	**3.592**
Change in eating habits								

No		1				1		
Yes	**<0.001**	**2.272**	**1.717**	**3.007**	**<0.001**	**1.939**	**1.380**	**2.724**
Diet practices								
No		1				1		
Yes	**0.026**	**1.369**	**1.038**	**1.805**	0.389	0.854	0.596	1.223
Worries about weight								
No		1				1		
Yes (fear of gaining weight)	**<0.001**	**3.150**	**2.275**	**4.362**	**0.008**	**1.750**	**1.161**	**2.638**
Yes (fear of losing weight)	0.270	0.725	0.409	1.284	0.162	0.616	0.312	1.215
Body perception								
Adequate		1				1		
Inadequate	**0.027**	**1.535**	**1.049**	**2.246**	0.600	1.134	0.709	1.811
Body dissatisfaction								
No		1				1		
Yes	**0.001**	**2.224**	**1.391**	**3.555**	0.347	1.306	0.749	2.276
Intuitive eating - Subscale UPE	0.081	0.845	0.700	1.021	0.345	1.132	0.876	1.462
Intuitive eating - Subscale EPR	**<0.001**	0.561	0.477	0.660	**0.023**	**0.781**	**0.632**	**0.966**
Intuitive eating - Subscale RHSC	**0.001**	**0.761**	**0.650**	**0.891**	0.835	1.023	0.827	1.266
Intuitive eating - Subscale B-FCC	**0.017**	**0.820**	**0.696**	**0.966**	0.120	1.191	0.955	1.485
BMI								
Low weight		1				1		
Eutrophy	**0.005**	**2.152**	**1.260**	**3.674**	0.401	1.338	0.679	2.639
Overweight	**<0.001**	**3.588**	**2.012**	**6.397**	0.144	1.789	0.819	3.906
Obesity	**<0.001**	**6.838**	**3.582**	**13.056**	**0.021**	**2.759**	**1.165**	**6.533**

Crude and adjusted binary logistic regression. Hosmer and Lemeshow Test: Sig. 0.554. R square Nagelkerke: 0.252. BMI: Body Mass Index. OR: Odds Ratio. CI: Confidence Interval. MW: Minimum wages. B-FCC: Body-Food-Choice Congruence. EPR: Eating for physical rather than emotional reasons. IES: Intuitive Eating Scale. RHSC: Reliance on hunger and satiety cues. UPE: Unconditional permission to eat.

DISCUSSION

In this work, it was found that appetite, changes in diet, concern about weight and BMI are directly associated with weight gain in university students at the beginning of the COVID-19 pandemic. Showing an increase in appetite increased the chances of weight gain by about 2.5 times, while having changes in diet, as well as worrying about weight gain, practically doubled those chances. The presence of obesity contributed to an increase in the chances of weight gain in this population by 276%. In contrast, the EPR intuitive eating subscale was associated with significantly lower chances of students showing this gain.

The COVID-19 pandemic required restrictive social distancing measures across the country, which led to changes in lifestyle, body weight and eating behavior. It was found that 45.7% of university students reported weight gain during this period. Similar results were found in a study carried out in Italy, in which a perception of weight gain was observed in 48.3% of the participants[18]. The study's findings are superior to those found in a study with the Brazilian adult population, which observed a prevalence of weight gain of 19.7%[19], However, in which younger ages were risk factors for weight gain, difference which was not found in our work, due to little age variation among participants.

Increased appetite was associated with greater chances of weight gain by university students during social distancing, corroborates research carried out in Italy, in which 1214 participants (34.4%) reported an increase in the feeling of hunger, which suggests that this increase, together with changes in eating habits, it may explain the perception of weight gain observed in 48.6% of the population[18].

The social distance of the population in the face of the pandemic caused changes in routine, leading to several impacts on mental health. A Brazilian investigation considering all regions during social distancing revealed symptoms of depression, anxiety and stress, and individuals between 18 and 30 years old had higher frequencies of depression and anxiety, and higher levels of these symptoms and stress were associated with students in comparison to those with other professional occupations[20].

Prolonged stress is marked by increased levels of cortisol in the body, together with other negative feelings, and can lead to an increase in the feeling of hunger, leading to the use of food as a strategy to deal with negative feelings, the so-called emotional eating[21]. On the other hand, an inverse association between weight gain and intuitive eating was observed in university women, with emphasis on the subscale of this construct that deals exactly with emotional eating, the EPR.

This subscale reflects the consumption of food to satisfy the physiological needs of hunger and not to deal with negative emotions[15].

A higher score on the EPR intuitive eating subscale was associated with a 22% reduction in the students' odds of experiencing weight gain. Eating for physical rather than emotional reasons detects individuals' eating patterns. When they are physically hungry, people who eat intuitively eat to satisfy that hunger and stop when they are satiated[22]. A similar result was observed in a study, whereby individuals who gained weight had lower scores on intuitive eating than those with stable weight, especially on the subscales EPR, RHSC and B-FCC[23].

These results corroborate the influence of stress on individual food choices, especially in the context of a pandemic. In research carried out with university students, it was found that students with high levels of perceived stress had higher scores for eating behaviors associated with emotional eating. Such data show that, in stressful situations, food choices are mostly established by emotional factors, as well as the difficulty of controlling the amount ingested[1].

Individuals tend to eat more, as well as migrate their food choices to "comfort foods", commonly high in sugars, fats, and of greater caloric density, which contributes to weight gain. The exacerbated demand for these foods is justified because the consumption of these nutrients stimulate the production of serotonin, which has a positive effect on mood[24]. Therefore, eating intuitively can play a protective role against the negative impact on food consumption by external factors, especially those related to emotional eating resulting from the COVID-19 pandemic.

From the results, people changed their food consumption. Among these changes, the frequent consumption of sweets and the exchange of main meals for snacks. A similar result was observed in a study with adults, which demonstrated that of the people who showed changes in diet to a less healthy pattern, 72.3% said they had gained weight during the pandemic[25]. These data corroborate another study showing that changes in eating habits were associated with weight gain[26]. It can be attributed to the negative changes observed in most eating behaviors, a drop in motivation to maintain a healthy diet, an increase in eating motivated by mood, as well as anxiety or boredom[27].

Obesity and weight concerns were significantly associated with greater odds of weight gain. Having obesity in association with increased time at home can promote additional eating due to psychological effects such as anxiety and stress, leading to consequences that can compromise the individual's health, such as the adoption of unhealthy weight control strategies, eating emotional and disordered eating[7,28]. Research during the COVID-19 pandemic demonstrated that emotional

eating significantly increased with a higher level of negative emotions, i.e. anxiety and depression, and with higher BMI scores[29].

Concern about weight can lead young people to acquire dysfunctional eating behaviors that disrupt perceptions of hunger and satiety, such as eating to deal with negative affects, which generates an increase in food consumption. Recent research has shown that weight concerns were associated with extreme weight management behaviors among Brazilian adolescents, and that those who are overweight are more vulnerable to adopting extreme behaviors compared to those with normal weight[30]. Thus, it can be inferred that these individuals have difficulties in recognizing internal signals to start or stop food consumption, modifying eating patterns that can lead to weight disorders, such as obesity[31].

CONCLUSION

In this work, it was demonstrated that positive changes in appetite, changes in diet, concern about weight and obesity increased the chances of weight gain in university students in the first wave of the COVID-19 pandemic. On the other hand, eating more for physical than emotional reasons was associated with significantly lower chances of students showing this gain.

These data can, therefore, point to the need for new nutritional strategies, mainly based on intuitive eating, with a view to minimizing the negative impacts of the pandemic on eating behavior in order to prevent excessive weight gain in university students.

Among the limitations of the present study, the transversality of the data stands out, which does not allow inferring causality. Also, the collection was carried out with self-reported data, collected online. In addition, other students may not have completed the survey due to difficulties accessing the internet.

In turn, this work contributes to the knowledge and planning of actions aimed at the university population, in addition to dietary recommendations, by considering aspects of eating behavior, especially emotional eating in stressful situations. This becomes especially relevant in the context of the pandemic, which can lead to changes that interfere with food consumption, with consequent weight gain.

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