ORIGINAL ARTICLE

INTUITIVE EATING REDUCED DIETARY RESTRAINT IN UNIVERSITY STUDENTS DURING THE COVID-19 PANDEMIC: A COHORT STUDY

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Highlights: (1) Restrictive dieting increased with weight concern and social media exposure. (2) Intuitive eating showed a protective effect against restrictive dieting. (3) Restrictive dieting decreased after 12 months of the COVID-19 pandemic.

PRE-PROOF
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ABSTRACT

Objective. To assess the practice of restrictive dieting among university students, its associated factors, and the role of intuitive eating during the first and second years of the COVID-19 pandemic in Brazil. **Method.** This is a longitudinal study, with the first data collection carried out in the first bimester of the pandemic and the beginning of social distancing measures in Brazil (May 2020), and the second data collection carried out in the second year of the pandemic (March 2021). The study population consisted of 293 undergraduate students from a federal university in southeastern Brazil. The survey was conducted through an online questionnaire (with self-reported information) and participants were invited via institutional email and social media promotion. **Results.** It was observed that being overweight (OR=2.415; CI=1.326–4.397; p=0.004), following fitness/health-related social media profiles (OR=1.915; CI=1.093–3.355; p=0.023), and being at risk for eating disorders (OR=2.531; CI=1.352–4.739; p=0.004) were associated with engaging in restrictive dieting among university students at the beginning of the COVID-19 pandemic. Additionally, engaging in physical activity (OR=2.852; CI=1.473–5.521; p=0.002) and concern about weight gain (OR=2.484; CI=1.235–4.996; p=0.011) were associated with the same outcome in the second year of the pandemic. Conversely, intuitive eating was associated with a lower likelihood of practicing a restrictive dieting (OR=0.601; CI=0.372–0.970; p=0.037). Furthermore, a decrease in dieting practices was observed over the follow-up (p<0.001). **Conclusions.** The practice of restrictive diets decreased after the first year of the pandemic and intuitive eating provided a protective effect for this practice**.**

Keywords: Feeding Behavior. Intuitive Eating. Diets. Longitudinal Studies. COVID-19.

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INTRODUCTION

Restrictive diets are defined as dietary restrictions derived from a cognitive effort to reduce or limit food intake with the aim of controlling body weight, and are often associated with the development of eating disorders. These restrictions may involve limiting the amount of food consumed, avoiding specific foods considered "unhealthy," engaging in prolonged periods of fasting, and adhering to rigid dietary rules [1] [2].

Restrictive diets generally lead to short-term weight loss; however, these losses are typically not maintained, even with professional follow-up. Sustained weight loss is achieved by only a minority of individuals, and long-term health outcomes are not observed [3].

Changes in eating behavior, including the practice of these types of diets, may intensify in stressful situations that lead to significant lifestyle changes. Recently, the COVID-19 pandemic has been identified as an important stressor [4]. On March 11, 2020, COVID-19 was characterized as a pandemic by the World Health Organization (WHO). Following this, a series of public health measures were implemented worldwide, with social isolation as the primary strategy to control transmission, leading to the closure of various establishments, including schools and universities [5].

Lifestyle changes due to the COVID-19 pandemic have made individuals more susceptible to physical, cognitive, behavioral, and emotional alterations, leading to social and psychological impacts [6]. In this context, university students constitute a particularly vulnerable group, as they exhibit high levels of stress, depression, and anxiety during the COVID-19 pandemic [4,7,8]. Such emotional changes may negatively affect eating behaviors and body weight, favoring dysfunctional eating behaviors, including restrictive dieting, which may lead to various adverse health outcomes, such as psychological distress and nutrient deprivation [9]. Restrictive dieting and disordered eating are also associated with an increased risk of developing psychiatric conditions, such as anxiety, depression, and eating disorders [10] [11].

In contrast to the practice of restrictive dieting, an approach to eating guided by internal hunger and satiety cues has been highlighted. This approach helps individuals attend to the sensory

properties of foods and was developed with the aim of minimizing external influences on food intake: intuitive eating [12]. It is a compassionate form of self-care that promotes respect for and dignity toward one's own body. Its central purpose is to foster a balanced connection between eating, mind, and body. The core components of this approach include recognizing hunger signals, perceiving satiety, and exploring eating-related satisfaction, and are associated with benefits such as greater body satisfaction and improved quality of life, as well as lower levels of disordered eating behaviors [13,14]. Accordingly, intuitive eaters are less likely to engage in dieting practices and unhealthy weight control behaviors [15].

Considering the above, this study aimed to assess the practice of restrictive dieting and its potential associated factors, including sociodemographic characteristics, lifestyle behaviors, anthropometric indicators, and behavioral aspects such as intuitive eating, both at the onset and during the second year of the COVID-19 pandemic in Brazil, taking into account their risks and implications for the health of university students.

METHODS

The study population consisted of undergraduate students enrolled at a federal university in southeastern Brazil. Individuals aged 18 years or older, of both sexes, and regularly enrolled in in-person courses at the two campuses located in the state capital were eligible to participate. The study was conducted using an online questionnaire, and participants were recruited via institutional email and social media outreach. All individuals who agreed to participate by providing informed consent through the Informed Consent Form (ICF) were included. Pregnant and lactating women were excluded due to eating behavior changes inherent to these life stages.

This is a longitudinal study, with the first data collection conducted during the first two months of the pandemic and the beginning of social distancing measures in Brazil (May 2020), and the second data collection carried out in the second year of the pandemic (March 2021). In both periods, a semi-structured online questionnaire (self-reported information) was administered through a survey platform.

Participants initially reported sociodemographic and academic data, including age, sex, marital status, race/ethnicity, family income expressed in multiples of the minimum wage, and field of study (health-related or non-health-related). Subsequently, they were asked about adherence to social distancing measures. Regarding lifestyle behaviors, participants provided information on alcohol intake, tobacco use, and physical activity.

With respect to anthropometric measures, self-reported weight and height were collected, enabling the calculation of body mass index (BMI) and the classification of nutritional status (underweight/normal weight and overweight/obesity) [16].

To analyze behavioral aspects, participants reported whether they were concerned about weight gain and whether they followed fitness/health profiles on social media. To assess body satisfaction, the silhouette scale developed for the evaluation of Brazilian children and adults of both sexes was used, validated for digital use by Freire and Fisberg [17].

Intuitive eating was assessed using the Intuitive Eating Scale-2 (IES-2), proposed by Tylka and Kroon Van Diest, and translated into Portuguese by Da Silva *et al.* [18] [19]. This questionnaire contains 23 items that assess four different factors (subscales): Unconditional Permission to Eat (UPE); Eating for Physical Reasons Rather Than Emotional Reasons (EPR); Reliance on Hunger and Satiety Cues (RHSC); and Body Food Choice Congruence (B-FCC). The test result is obtained by calculating the total score and the subscale scores, from the average of the questions, with higher scores indicating a higher level of intuitive eating, indicating a way of eating guided by internal bodily cues, including hunger and satiety [19].

The risk for eating disorders was assessed using the Eating Attitudes Test-26 (EAT-26) [20]**.** The instrument is designed to screen for symptoms and risk behaviors for the development of eating disorders, detecting clinical cases in high-risk populations and identifying individuals with abnormal concerns about eating and weight [21]. A score of 21 or higher identifies the individual as being at risk for eating disorders [20].

In addition, the practice of restrictive dieting was assessed as the dependent variable of the present study. Participants answered the question: “Have you ever followed a diet for weight

loss or as a treatment for a disease?", with response options "No" or "Yes." Those who responded "Yes" were subsequently asked which diets they had followed. Responses were analyzed and classified according to a previously established criterion, with only diets involving severe restriction of food groups, caloric intake, or meal timing being considered restrictive, excluding those prescribed for the management of chronic conditions such as diabetes, hypertension, and food allergies. Furthermore, approaches focused on nutrition education without rigid restrictions were not classified as restrictive diets, in order to avoid bias in the categorization of the variable.

Data were analyzed using IBM SPSS Statistics for Windows software, version 22.0 (Armonk, NY: IBM Corp). Normality was assessed using the Shapiro-Wilk test. To describe the study variables, averages (with interquartile range), and absolute and relative frequencies were used. To test the association between the dependent variable and the independent variables at each time point, the Chi-square test or Fisher's exact test (categorical variables) and the Mann-Whitney test (numerical variables) were used. In order to compare the two data collection moments, the McNemar test was used to analyze the difference between the proportions, and the Wilcoxon test was used to analyze the difference between the averages. The significance level for all tests was 5%.

To quantify the contribution of independent variables to the outcome, binary logistic regression analyses were performed for both time points, including in the model those independent variables with statistical significance below 5% ($p \leq 0.05$) in the bivariate association tests. The assumptions of absence of multicollinearity were considered, and model fit was assessed using the Hosmer–Lemeshow test. Odds ratios (OR) and their respective confidence intervals were estimated for both time points.

The research was approved by the Research Ethics Committee of the institution where the research was conducted (Approval number 4.022.658, of May 12, 2020, and 4.080.199, of June 9, 2020). Participation was voluntary and consent was given through agreement with the ICF, where participants were made aware of the study, confidentiality of the information was

obtained, and anonymity was guaranteed, in accordance with Resolution CNS 466/12 of the Ministry of Health [22].

RESULTS

The study included 293 students, predominantly female (n=217; 74.1%), with a median age of 22 years. Most participants were not living with a partner (n=256; 87.4%) and had a family income above two minimum wages (n=161; 58.3%). In addition, the majority were enrolled in non-health-related programs (n=177; 60.4%).

When comparing data from the beginning and after 12 months of the COVID-19 pandemic (Table 1), an increase was observed in the proportion of individuals who followed fitness/health-related profiles ($p<0.001$). An increase in the total intuitive eating score was also observed ($p=0.018$). Conversely, there was a decrease in the practice of restrictive dieting ($p<0.001$), as well as in the EPR ($p=0.035$) and B-FCC ($p=0.035$) subscales of intuitive eating. Regarding the UPE subscale of intuitive eating, despite a significant difference between the two time points ($p=0.026$), it was not possible to determine whether this score increased or decreased.

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Table 1 - Data related to lifestyle, anthropometric and behavioral habits of undergraduate students at a federal university in southeastern Brazil at the beginning and second year of the COVID-19 pandemic.

Variable	(Beginning)	(Second year)	p-valor	Total
	N (%)	N (%)		N (%)
Physical activity			0.337	
No	121 (41.3)	111 (37.9)		232 (39.6)
Yes	172 (58.7)	182 (62.1)		354 (60.4)
Nutritional status			0.310	
Low weight/Eutrophy	193 (65.9)	186 (63.5)		379 (64.6)
Overweight/Obesity	100 (34.1)	107 (36.5)		207 (35.3)
Concern about weight gain			0.902	
No	106 (36.2)	104 (35.5)		210 (35.8)
Yes	187 (63.8)	189 (64.5)		376 (64.2)
Follow fitness/health profile			**<0.001**	
No	181 (61.8)	128 (43.7)		309 (52.7)
Yes	112 (38.2)	165 (56.3)		277 (47.2)
Risk for eating disorders			0.658	
No	210 (71.7)	219 (75.3)		429 (74.4)
Yes	75 (25.6)	72 (24.7)		147 (25.6)
Intuitive eating Total Score IES-2*[a]	3.47 ± 0.82	3.47 ± 0.91	**0.018**	
Intuitive Eating – UPE Subscale *[a]	3.83 ± 1	3.83± 1	**0.026**	
Intuitive Eating – EPR Subscale*[a]	3.25 ± 1.19	3.25 ± 1.12	**0.035**	
Intuitive Eating – RHSC Subscale*[a]	3.33 ± 1.34	3.33 ± 1.34	0.818	
Intuitive Eating - B-FCC Subscale*[a]	3.66 ± 1.33	3.66 ± 1	**0.035**	
Practice of restrictive diets			**<0.001**	
No	180 (61.4)	222 (75.8)		402 (68.6)
Yes	113 (38.6)	71 (24.2)		184 (31.3)

*Data expressed as p50 ± interquartile range (IIQ). McNemar test. [a]Wilcoxon test. In bold: statistically significant difference (p<0.05). 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 presents the data distributed according to the practice of restrictive dieting at the beginning of the COVID-19 pandemic. The practice of restrictive dieting was associated with sex (p=0.005), tobacco use (p=0.009), concern about weight gain (p<0.001), body dissatisfaction (p=0.005), following fitness/health-related profiles (p=0.002), nutritional status (p<0.001), risk for eating disorders (p<0.001), and the RHSC subscale of intuitive eating, which assesses reliance on hunger and satiety cues (p=0.013).

Table 2 - Sociodemographic, academic, pandemic-related, lifestyle, anthropometric and behavioral data distributed according to practice of restrictive diets in undergraduate students at a federal university in southeastern Brazil at the beginning of the COVID-19 pandemic.

Variable	Practice of restrictive diets **(beginning)**		p-valor	Total
	No	**Yes**		
	N (%)	N (%)		N (%)
Age	22 ± 5	22 ± 6	0.337	22 ± 5
Sex			**0.005**	
Male	57 (31.6)	19 (16.8)		76 (25.9)
Female	123 (68.3)	94 (83.1)		217 (74.0)
Marital status			0.792	
Does not live maritally	158 (87.8)	98 (86.7)		256 (87.3)
Lives maritally	22 (12.2)	15 (13.2)		37 (12.6)
Race (skin color)[a2]			0.564	
White	84 (48.8)	61 (54.9)		145 (51.2)
Black	22 (12.7)	15 (13.5)		37 (13.0)
Mixed race	64 (37.2)	35 (31.5)		99 (34.9)
Asian/indigenous	2 (1.1)	0		2 (0.7)
Family income			0.251	
< 2 MW	75 (44.4)	40 (37.4)		115 (41.7)
> 2 MW	94 (55.6)	67 (62.6)		161 (58.3)
Undergraduate area of study			0.359	
Health sciences	75 (41.6)	41 (36.2)		116 (39.5)
Not health sciences	105 (58.3)	72 (63.7)		177 (60.4)
Alcohol drinking			0.104	
No	94 (52.2)	48 (42.5)		142 (48.5)
Yes	86 (47.8)	65 (57.5)		151 (51.5)
Tobacco use			**0.009**	

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No	163 (90.6)	111 (98.2)		274 (93.5)
Yes	17 (9.4)	2 (1.8)		19 (6.5)
Physical activity			0.060	
No	82 (45.5)	39 (34.5)		121 (41.2)
Yes	98 (54.4)	74 (65.4)		172 (58.7)
Weight*	60.5 ± 18.25	67 ± 21	0.182	64 ± 20.2
BMI*	22.07 ± 5.3	24.84 ± 6.08	0.380	23.43 ± 6.14
Nutritional status			**<0.001**	
Low weight/Eutrophy	135 (75.0)	58 (51.3)		193 (65.8)
Overweight/Obesity	45 (25)	55 (48.6)		100 (34.1)
Concern about weight gain			**<0.001**	
No	82 (45.6)	24 (21.2)		106 (36.2)
Yes	98 (54.4)	89 (78.8)		187 (63.8)
Follow fitness/health profile			**0.002**	
No	124 (82.6)	57 (50.4)		181 (61.7)
Yes	26 (17.3)	56 (49.5)		112 (38.2)
Body dissatisfaction			**0.005**	
No	19 (10.5)	2 (1.7)		21 (7.1)
Yes	161 (89.4)	111 (98.2)		272 (92.8)
Risk for eating disorders [1]			**<0.001**	
No	147 (83.5)	63 (57.7)		210 (74.2)
Yes	29 (16.4)	46 (42.2)		75 (26.5)
Intuitive eating Total Score IES-2*	3.57 ± 0.7	3.26 ± 0.92	0.281	3.47 ± 0.82
Intuitive Eating - UPE Subscale*	3.83 ± 1.0	3.5 ± 1.0	0.160	3.83 ± 1
Intuitive Eating - EPR Subscale*	3.31 ± 1.13	3.0 ± 1.37	0.869	3.25 ± 1.19
Intuitive Eating - RHSC Subscale*	3.58 ± 1.17	3.17 ± 1.33	**0.013**	3.33 ± 1.34
Intuitive Eating- B-FCC Subscale*	3.33 ± 1.33	3.67 ± 1.0	0.719	3.66 ± 1.33

Chi-square test. [a]Fisher's exact test. *Data expressed as p50 ± interquartile range (IIQ); Mann-Whitney test. In bold: statistically significant difference (p<0.05). N=293. [1]N=285. [2]N=283. [3]N=276. 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.

Table 3 presents the data distributed according to the practice of dieting in the second year of the pandemic. Physical activity (p=0.001) was associated with the outcome of dieting. Three variables remained associated with the practice of restrictive dieting: concern about weight gain (p=0.001), following fitness/health-related profiles (p=0.002), and risk for eating disorders (p=0.008). In addition, an association was observed with the UPE subscale of intuitive eating, which assesses unconditional permission to eat (p=0.001).

Table 3 - Sociodemographic, academic, pandemic-related, lifestyle, anthropometric and behavioral data distributed according to practice of restrictive diets in undergraduate students at a federal university in southeastern Brazil in the second year of the COVID-19 pandemic.

Variable	Practice of restrictive diets **(Second year)**			
	No	**Yes**	**p-valor**	**Total**
	N (%)	N (%)		N (%)
Age	22 ± 5	22 ± 4	0,569	22 ± 5
Sex			0.170	
Male	62 (27.9)	14 (19.7)		76 (25.9)
Female	160 (72.0)	57 (80.2)		217 (74.0)
Marital status			0.671	
Does not live maritally	195 (87.8)	61 (85.9)		256 (89.1)
Live maritally	27 (12.1)	10 (14.0)		37 (12.8)
Race (skin color)[a3]			0.769	
White	106 (49.7)	39 (55.7)		145 (51.2)
Black	30 (14.0)	7 (10.0)		37 (13.0)
Mixed race	75 (35.2)	24 (34.2)		99 (34.9)
Asian/indigenous	2 (0.93)	0		2 (0.7)
Family income[2]			0.051	
< 2 MW	98 (45.6)	23 (32.4)		121 (42.3)
> 2 MW	117 (54.4)	48 (67.6)		165 (57.7)
Undergraduate area of study			0.173	
Health Sciences	83 (37.3)	33 (46.4)		116 (39.5)
Not health sciences	139 (62.6)	38 (53.5)		177 (60.4)
Alcohol drinking			0.865	
No	112 (50.5)	35 (49.3)		147 (50.2)
Yes	110 (49.5)	36 (50.7)		146 (49.8)
Tobacco use			0.070	
No	201 (90.5)	69 (97.2)		270 (92.2)
Yes	21 (9.5)	2 (2.8)		23 (7.8)

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Physical activity			**0.001**	
No	96 (43.2)	15 (21.1)		111 (37.8)
Yes	126 (56.7)	56 (78.8)		182 (62.1)
Weight*	63.50 ± 20.5	64 ± 21.1	0.308	64 ± 20.3
BMI*	23.01 ± 6.57	24.34 ± 7.79	0.473	23.53 ± 6.38
Nutritional status			0.151	
Low weight/Eutrophy	146 (65.8)	40 (56.3)		186 (63.5)
Overweight/Obesity	76 (34.2)	31 (43.7)		107 (36.5)
Concern about weight gain			**0.001**	
No	90 (40.5)	14 (19.7)		104 (35.5)
Yes	132 (59.5)	57 (80.3)		189 (64.5)
Follow fitness/health profile			**0.002**	
No	108 (48.6)	20 (28.2)		128 (43.7)
Yes	114 (51.4)	51 (71.8)		165 (56.3)
Body dissatisfaction			0.914	
No	24 (10.8)	8 (11.3)		32 (10.9)
Yes	198 (89.2)	63 (88.7)		261 (89.1)
Risk for eating disorders[1]			**0.008**	
No	174 (79.1)	45 (63.4)		219 (75.3)
Yes	46 (20.9)	26 (36.6)		72 (24.7)
Intuitive eating Total Score IES-2*	3.52 ± 0.82	3.22 ± 0.87	0.080	3.47 ± 0.91
Intuitive Eating - UPE Subscale*	3.92 ± 0.83	3.67 ± 1.17	**0.001**	3.83± 1
Intuitive Eating - EPR Subscale*	3.38 ± 1.13	3 ± 1.38	0.184	3.25 ± 1.12
Intuitive Eating - RHSC Subscale*	3.5 ± 1.17	3.33 ± 1.5	0.363	3.33 ± 1.34
Intuitive Eating- B-FCC Subscale*	3.67 ± 1.0	3.67 ± 1.0	0.209	3.66 ± 1

Chi-square test. [a]Fisher's exact test. *Data expressed as p50 ± interquartile range (IIQ); Mann-Whitney test. In bold: statistically significant difference ($p<0.05$). N=293. [1]N=291. [2]N=286. [3]N=283. 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.

In the multivariable analysis using binary logistic regression (Table 4), when examining associations among variables at the beginning of the COVID-19 pandemic, being overweight or obese was associated with restrictive dieting (OR=2.415; CI=1.326–4.397; p=0.004). Additionally, following fitness/health-related social media profiles was associated with restrictive dieting (OR=1.915; CI=1.093–3.355; p=0.023), showing a magnitude similar to that observed among individuals at risk for eating disorders (OR=2.531; CI=1.352–4.739; p=0.004).

In the analysis of associations among variables obtained in the second year of the pandemic, engaging in physical activity (OR=2.852; CI=1.473–5.521; p=0.002) and concern about weight gain (OR=2.484; CI=1.235–4.996; p=0.011) more than doubled the likelihood of participants engaging in restrictive dieting. In contrast, unconditional permission to eat (UPE subscale of intuitive eating) reduced this likelihood by 40% (OR=0.601; CI=0.372–0.970; p=0.037).

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Table 4 - Multiple analysis on the practice of diets in undergraduate students at a federal university in southeastern Brazil at the beginning and second year of the COVID-19 pandemic.

Variable	Crude				Adjusted			
	p valor	OR	IC95%		p valor	OR	IC95%	
			Lower	Upper			Lower	Upper
BEGINNIG OF THE COVID-19 PANDEMIC								
Sex								
Male		1				1		
Female	**0.005**	**2.293**	**1.278**	**4.113**	0.070	1.904	0.950	3.818
Tobacco use								
No		1				1		
Yes	**0.020**	**5.788**	**1.311**	**25.552**	0.059	0.213	0.043	1.064
Nutritional status								
Low weight/Eutrophy		1				1		
Overweight/Obesity	**<0.001**	**2.845**	**1.726**	**4.690**	**0.004**	**2.415**	**1.326**	**4.397**
Concern about weight gain								
No		1				1		
Yes	**<0.001**	**3.103**	**1.812**	**5.313**	0.085	1.726	0.928	3.209
Follow fitness/health profile								
No		1				1		
Yes	**0.002**	**2.175**	**1.339**	**3.535**	**0.023**	**1.915**	**1.093**	**3.355**
Body dissatisfaction								
No		1				1		
Yes	**0.013**	**6.550**	**1.496**	**28.685**	0.140	4.804	0.597	38.693
Risk for eating disorders								
No		1				1		
Yes	**<0.001**	**3.701**	**2.134**	**6.418**	**0.004**	**2.531**	**1.352**	**4.739**
Intuitive Eating - RHSC Subscale	**0.002**	**0.640**	**0.484**	**0.848**	0.493	0.893	0.645	1.235
SECOND YEAR OF THE COVID-19 PANDEMIC								

Physical activity								
No		1				1		
Yes	**0.001**	**2.844**	**1.517**	**5.334**	**0.002**	**2.852**	**1.473**	**5.521**
Concern about weight gain								
No		1				1		
Yes	**0.002**	**2.776**	**1.459**	**5.281**	**0.011**	**2.484**	**1.235**	**4.996**
Follow fitness/health profile								
No		1				1		
Yes	**0.003**	**2.416**	**1.352**	**4.316**	0.055	1.822	0.986	3.366
Risk for eating disorders								
No		1				1		
Yes	**0.008**	**2.186**	**1.221**	**3.911**	0.966	1.016	0.481	2.149
Intuitive Eating - UPE Subscale	**<0.001**	**0.514**	**0.353**	**0.747**	**0.037**	**0.601**	**0.372**	**0.970**

Crude and adjusted binary logistic regression. Hosmer and Lemeshow test: Beginning- 0.671; 12 months - 0.956. Nagelkerke R square: beginning- 0.271; 12 months - 0.174. In bold: statistically significant difference ($p<0.05$). RHSC = Reliance on hunger and satiety cues. UPE = Unconditional permission to eat. OR: Odds Ratio. CI: Confidence Interval.

DISCUSSION

The results of this study demonstrated that, at the beginning of the COVID-19 pandemic, being overweight/obese, following fitness/health profiles, and being at risk for eating disorders increased the chances of practicing restrictive diets. In the second year of the pandemic, practicing physical activity and being concerned about weight gain doubled the chances of this practice. However, eating with unconditional permission (UPE subscale of intuitive eating) in the same period demonstrated to be a protective factor, reducing the chances of practicing diets.

In our study, individuals with overweight or obesity had 2.4 times higher odds of engaging in restrictive dieting. In this population, entering university is associated with a certain degree of

stress, which has been linked to less healthy food choices, changes in eating behavior, overweight, and obesity, with weight gain being a common phenomenon among students [23] [24]. This subsequent weight gain may lead to body dissatisfaction and influence the pursuit of diets aimed at rapid weight loss, such as restrictive dieting [25]. However, this type of diet may, in turn, contribute to weight gain, as at least one-third of individuals who engage in dietary restriction not only regain their previous weight but also experience metabolic adaptations that promote further weight gain [26,27].

The relationship between excess weight and dieting practices is therefore bidirectional. Restrictive dieting promotes a cycle of weight loss and weight regain, and this pattern increases cardiovascular risks, as weight regain is associated with hypertension, visceral fat accumulation, insulin resistance, and dyslipidemia [28]. After restriction, hunger and food intake increase significantly, contributing to full weight regain and even exceeding baseline body fat percentage, with a reduction in fat-free mass. In addition to contributing to weight regain, high levels of dietary restriction are also associated with an increased risk of disordered eating behaviors, higher levels of depressive and anxiety symptoms, more problematic alcohol use, and increased anhedonia [29].

In Brazil, internet searches for weight-loss strategies were substantial during the period from March 1, 2020, to August 1, 2021, with “diet” and “fasting” among the most frequently searched terms [30]. Media pressure, particularly through social networks, to lose weight may influence adherence to such diets, with comments about appearance being the main driver of dietary restriction [31] [32]. During the early period of the pandemic, content featuring weight-loss tips, exercise plans, and posts related to fear of weight gain became trending topics on social media [33]. These findings are consistent with those of the present study, which demonstrated that following fitness/health-related profiles on social media doubled the likelihood of students engaging in restrictive dieting.

Our study also demonstrated an association between risk for eating disorders and the practice of restrictive dieting. This finding is consistent with the study by Romano and Lipson (2021), which found that university students engaging in moderate to high dietary restriction were more

likely to present dysfunctional attitudes related to eating, which are characteristic of eating disorders [2]. Furthermore, evidence shows that most individuals with eating disorders report having initiated dieting prior to the onset of disordered eating behaviors, and that dieting predicts an increased risk of developing an eating disorder. Interventions that consider factors associated with eating disorder risk and prevent young people from engaging in dieting practices have the potential to reduce the incidence of both eating disorders and obesity [34] [11].

It was also observed in the second year of the pandemic that engaging in physical activity increased the likelihood of students adhering to restrictive dieting by 2.8 times. Physical exercise is part of a healthy lifestyle; however, it may be characterized as a risk behavior when performed excessively, at high frequency, continued despite injury, and in a dysfunctional manner, as a compensatory mechanism for weight loss or weight maintenance [35]. Compensatory exercise behavior is more prevalent among individuals who present more thoughts and behaviors characteristic of eating disorders [36].

Excessive physical activity in young people with eating disorders is related to obsessive thoughts, compulsive traits, and feelings of impulsivity. Additionally, it is also associated with problematic internet use and fitness apps, corroborating the findings of the present study, as the practice of restrictive diets is associated with both social media use and physical activity practice in the evaluated population [37].

The results also showed that concern about weight gain doubled the likelihood of students engaging in restrictive dieting. Similar findings were reported in a study conducted in Salvador, in which concerns about body weight were associated with extreme weight-control behaviors, including dieting [38].

Therefore, various factors can contribute to the practice of restrictive diets. However, an approach based on more intuitive eating can play a protective role against dysfunctional eating behaviors. It is associated with better diet quality, fewer eating disorders, a more positive body image, less emotional eating, and lower BMI [39–41]. In our study, eating with unconditional

permission, as assessed by the UPE subscale of intuitive eating, reduced the chances of practicing restrictive diets by 40%.

As previously discussed, the adherence to restrictive diets can be influenced by the social environment. In contrast to this context, eating with unconditional permission is associated with a lower internalization of the appearance ideas propagated by the media. This subscale is also inversely related to the symptomatology of eating disorders. Considering that the risk for such disorders was observed in the studied population, it is noted the protective effect that this cognitive-free eating behavior can have on the individual [18]. In a study conducted with university students assessing eating motivations, it was demonstrated that students reporting weight- and emotion-related control motivations, as well as social norm and social image motivations, exhibited lower levels of intuitive eating [42]. Furthermore, increases in unconditional permission to eat among intuitive eaters may reduce feelings of deprivation and, consequently, decrease the risk of disordered eating episodes [43]. A longitudinal study evaluating eating behavior from adolescence to adulthood found that intuitive eating is associated with lower likelihood of engaging in unhealthy and extreme weight-control behaviors [44] a finding consistent with the present study.

Our data showed a reduction in the practice of restrictive dieting after 12 months of the pandemic. This decrease may reflect an overall improvement in the pandemic scenario, as the timing of the second data collection coincided with the beginning of COVID-19 vaccination in Brazil. Although university students were not part of the priority vaccination group during this period, it is possible that the availability of the vaccine contributed to improved well-being and to the relaxation of public health measures, supported by the belief that vaccination is an effective tool to significantly reduce the impact of the pandemic [45]. Considering that stress-related emotional states may lead to disordered eating and that individuals who engage in dietary restraint show increased eating in response to negative emotions, improvements in mental health and reductions in stress may have contributed to the decreased practice of restrictive dieting [46,47].

This study has some limitations, among which the online data collection and the use of self-reported information should be highlighted. However, this approach was adopted due to the context of social distancing, and several studies cited herein used the same methodology without compromising data reliability. Additionally, sample size calculation was not performed due to the absence of previous studies evaluating dieting practices as an outcome in similar samples. Nevertheless, a key strength of this study is its longitudinal design, which allowed the follow-up of changes in eating behavior according to the progression of the pandemic, elucidating the impact of stressful situations on dieting practices in a highly vulnerable population.

CONCLUSION

In this study, being overweight, following fitness/health-related profiles on social media, and being at risk for eating disorders were associated with increased likelihood of engaging in restrictive dieting among university students at the beginning of the COVID-19 pandemic. In addition, engaging in physical activity and concern about weight gain were associated with the same outcome in the second year of the pandemic. In contrast, intuitive eating showed a protective effect against these practices. Furthermore, the practice of restrictive dieting decreased in the second year of the pandemic. These findings provide important insights for the university student population, as dieting practices are associated with dysfunctional eating behaviors, weight regain, and adverse health outcomes.

REFERENCES

[1] Hagerman CJ, Stock ML, Beekman JB, Yeung EW, Persky S. The ironic effects of dietary restraint in situations that undermine self-regulation. Eat Behav 2021;43:101579. https://doi.org/10.1016/j.eatbeh.2021.101579.

[2] Romano KA, Lipson SK. Dietary restraint patterns and eating disorder help-seeking. Eat Weight Disord - Stud Anorex Bulim Obes 2021;26:159–68. https://doi.org/10.1007/s40519-019-00833-2.

[3] Dulloo AG, Jacquet J, Montani J-P. How dieting makes some fatter: from a perspective of human body composition autoregulation. Proc Nutr Soc 2012;71:379–89. https://doi.org/10.1017/S0029665112000225.

[4] Serafim AP, Durães RSS, Rocca CCA, Gonçalves PD, Saffi F, Cappellozza A, et al. Exploratory study on the psychological impact of COVID-19 on the general Brazilian population. PLOS ONE 2021;16:e0245868. https://doi.org/10.1371/journal.pone.0245868.

[5] Organização Pan-Americana da Saúde. Histórico da pandemia de COVID-19 - OPAS/OMS | Organização Pan-Americana da Saúde 2020. https://www.paho.org/pt/covid19/historico-da-pandemia-covid-19 (accessed February 18, 2022).

[6] Zhang J, Wu W, Zhao X, Zhang W. Recommended psychological crisis intervention response to the 2019 novel coronavirus pneumonia outbreak in China: a model of West China Hospital. Precis Clin Med 2020;3:3–8. https://doi.org/10.1093/pcmedi/pbaa006.

[7] Gandhi S, Jordan A, Glaman R, Morrow B. Unmasking the impact of COVID-19 on the mental health of college students: a cross-sectional study. Front Psychiatry 2024;15:1453323. https://doi.org/10.3389/fpsyt.2024.1453323.

[8] Makiling CDR, Baguio RV. Prevalence of Depression, Anxiety, and Stress among Students during the Covid-19 Pandemic. Glob Acad J Humanit Soc Sci 2025;7:14–21. https://doi.org/10.36348/gajhss.2025.v07i01.003.

[9] Habib A, Ali T, Nazir Z, Mahfooz A, Inayat Q-A, Haque MA. Unintended consequences of dieting: How restrictive eating habits can harm your health. Int J Surg Open 2023;60:100703. https://doi.org/10.1016/j.ijso.2023.100703.

[10] Loth KA, MacLehose R, Bucchianeri M, Crow S, Neumark-Sztainer D. Predictors of Dieting and Disordered Eating Behaviors From Adolescence to Young Adulthood. J Adolesc Health 2014;55:705–12. https://doi.org/10.1016/j.jadohealth.2014.04.016.

[11] Haines J, Neumark-Sztainer D. Prevention of obesity and eating disorders: a consideration of shared risk factors. Health Educ Res 2006;21:770–82. https://doi.org/10.1093/her/cyl094.

[12] Grider HS, Douglas SM, Raynor HA. The Influence of Mindful Eating and/or Intuitive Eating Approaches on Dietary Intake: A Systematic Review. J Acad Nutr Diet 2021;121:709-727.e1. https://doi.org/10.1016/j.jand.2020.10.019.

[13] Giacone L, Sob C, Siegrist M, Hartmann C. Intuitive eating and its influence on self-reported weight and eating behaviors. Eat Behav 2024;52:101844. https://doi.org/10.1016/j.eatbeh.2024.101844.

[14] Kayacan AG, Özçelik AÖ. The effects of intuitive eating on body appreciation, body mass ındex, and nutritional behaviors in adults: a sample of Türkiye. Rev Nutr 2023;36:e220121. https://doi.org/10.1590/1678-9865202336e220121.

[15] Christoph M, Järvelä-Reijonen E, Hooper L, Larson N, Mason SM, Neumark-Sztainer D. Longitudinal associations between intuitive eating and weight-related behaviors in a

population-based sample of young adults. Appetite 2021;160:105093. https://doi.org/10.1016/j.appet.2021.105093.

[16] WHO. Obesity: preventing and managing the global epidemic 2000.

[17] Freire SC, Fisberg M. Adaptação da Escala de Silhuetas Brasileiras para uso digital. J Bras Psiquiatr 2017;66:211–5. https://doi.org/10.1590/0047-2085000000173.

[18] Tylka TL, Kroon Van Diest AM. The Intuitive Eating Scale–2: Item refinement and psychometric evaluation with college women and men. J Couns Psychol 2013;60:137–53. https://doi.org/10.1037/a0030893.

[19] da Silva WR, Neves AN, Ferreira L, Campos JADB, Swami V. A psychometric investigation of Brazilian Portuguese versions of the Caregiver Eating Messages Scale and Intuitive Eating Scale-2. Eat Weight Disord - Stud Anorex Bulim Obes 2020;25:221–30. https://doi.org/10.1007/s40519-018-0557-3.

[20] Garner DM, Olmsted MP, Bohr Y, Garfinkel PE. The Eating Attitudes Test: psychometric features and clinical correlates. Psychol Med 1982;12:871–8. https://doi.org/10.1017/S0033291700049163.

[21] Alvarenga M dos S, Scagliusi FB, Philippi ST. Comportamento de risco para transtorno alimentar em universitárias brasileiras. Arch Clin Psychiatry São Paulo 2011;38:03–7. https://doi.org/10.1590/S0101-60832011000100002.

[22] Brasil. Resolução n o 466, de 12 de dezembro de 2012 - sobre pesquisas envolvendo seres humanos. n.d.

[23] Choi J. Impact of Stress Levels on Eating Behaviors among College Students. Nutrients 2020;12:1241. https://doi.org/10.3390/nu12051241.

[24] Papier K, Ahmed F, Lee P, Wiseman J. Stress and dietary behaviour among first-year university students in Australia: Sex differences. Nutrition 2015;31:324–30. https://doi.org/10.1016/j.nut.2014.08.004.

[25] Lôbo ILB, Mello MT de, Oliveira JRV de, Cruz MP, Guerreiro R de C, Silva A. Body image perception and satisfaction in university students. Rev Bras Cineantropometria Desempenho Hum 2020;22:e70423. https://doi.org/10.1590/1980-0037.2020v22e70423.

[26] Mann T, Tomiyama AJ, Westling E, Lew A-M, Samuels B, Chatman J. Medicare's search for effective obesity treatments: Diets are not the answer. Am Psychol 2007;62:220–33. https://doi.org/10.1037/0003-066X.62.3.220.

[27] Pélissier L, Bagot S, Miles-Chan JL, Pereira B, Boirie Y, Duclos M, et al. Is dieting a risk for higher weight gain in normal-weight individual? A systematic review and meta-analysis. Br J Nutr 2023;130:1190–212. https://doi.org/10.1017/S0007114523000132.

[28] Montani J-P, Viecelli AK, Prévot A, Dulloo AG. Weight cycling during growth and beyond as a risk factor for later cardiovascular diseases: the 'repeated overshoot' theory. Int J Obes 2006;30:S58–66. https://doi.org/10.1038/sj.ijo.0803520.

[29] Pollert GA, Kauffman AA, Veilleux JC. Symptoms of Psychopathology Within Groups of Eating-Disordered, Restrained Eating, and Unrestrained Eating Individuals: Symptoms of Psychopathology. J Clin Psychol 2016;72:621–32. https://doi.org/10.1002/jclp.22283.

[30] Gomes MT, Santos MLS, Silva HBM da, Nepomuceno CMM, Santana MLP de, Cunha C de M. "Dr. Google, preciso perder peso" – Pesquisas de brasileiros na internet associadas à perda de peso durante a pandemia do COVID-19: uma análise retrospectiva dos dados do Google Trends. Res Soc Dev 2021;10:e49101421647. https://doi.org/10.33448/rsd-v10i14.21647.

[31] Niu G, Sun L, Liu Q, Chai H, Sun X, Zhou Z. Selfie-Posting and Young Adult Women's Restrained Eating: The Role of Commentary on Appearance and Self-Objectification. Sex Roles 2020;82:232–40. https://doi.org/10.1007/s11199-019-01045-9.

[32] Saade S, Hallit S, Haddad C, Hallit R, Akel M, Honein K, et al. Factors associated with restrained eating and validation of the Arabic version of the restrained eating scale among an adult representative sample of the Lebanese population: a cross-sectional study. J Eat Disord 2019;7:24. https://doi.org/10.1186/s40337-019-0254-2.

[33] Pearl RL. Weight Stigma and the "Quarantine-15." Obesity 2020;28:1180–1. https://doi.org/10.1002/oby.22850.

[34] Oss LD, SALAROLI LB, Soares FLP. Riscos de transtornos alimentares em estudantes universitários na primeira onda da pandemia de COVID-19. Riscos Transtornos Aliment Em Estud Univ Na Prim Onda Pandemia COVID-19 2023;17. https://doi.org/10.34019/1982-1247.2023.v17.36528.

[35] Mond J, Gorrell S. "Excessive exercise" in eating disorders research: problems of definition and perspective. Eat Weight Disord - Stud Anorex Bulim Obes 2021;26:1017–20. https://doi.org/10.1007/s40519-020-01075-3.

[36] Schaumberg KE, Robinson L, Hochman A, Micali N. Prospective Associations Between Driven Exercise and Other Eating Disorder Behaviors in Adolescence: A Longitudinal Cohort Study. J Adolesc Health 2022;70:781–7. https://doi.org/10.1016/j.jadohealth.2021.11.022.

[37] Ioannidis K, Hook RW, Grant JE, Czabanowska K, Roman-Urrestarazu A, Chamberlain SR. Eating disorders with over-exercise: A cross-sectional analysis of the mediational role of problematic usage of the internet in young people. J Psychiatr Res 2021;132:215–22. https://doi.org/10.1016/j.jpsychires.2020.11.004.

[38] de Santana MLP, Assis AMO, Silva R de CR, Raich RM, Machado MEP da C, Pinto E de J, et al. Risk Factors for Adopting Extreme Weight-Control Behaviors among Public School

Adolescents in Salvador, Brazil: A Case-Control Study. J Am Coll Nutr 2016;35:113–7. https://doi.org/10.1080/07315724.2014.951903.

[39] Caferoglu Z, Toklu H. Intuitive eating: associations with body weight status and eating attitudes in dietetic majors. Eat Weight Disord - Stud Anorex Bulim Obes 2022;27:683–92. https://doi.org/10.1007/s40519-021-01206-4.

[40] Bruce LJ, Ricciardelli LA. A systematic review of the psychosocial correlates of intuitive eating among adult women. Appetite 2016;96:454–72. https://doi.org/10.1016/j.appet.2015.10.012.

[41] Hensley-Hackett K, Bosker J, Keefe A, Reidlinger D, Warner M, D'Arcy A, et al. Intuitive Eating Intervention and Diet Quality in Adults: A Systematic Literature Review. J Nutr Educ Behav 2022;54:1099–115. https://doi.org/10.1016/j.jneb.2022.08.008.

[42] Pereira ACDF, Lacerda Pires Soares F, Bresciani Salaroli L. Avaliação do Comer Intuitivo e Fatores Associados em Universitários Brasileiros na Pandemia do COVID-19. Mudanças - Psicol Saúde 2023;31:11–26. https://doi.org/10.15603/2176-1019/mud.v31n1p11-26.

[43] Anderson LM, Reilly EE, Schaumberg K, Dmochowski S, Anderson DA. Contributions of mindful eating, intuitive eating, and restraint to BMI, disordered eating, and meal consumption in college students. Eat Weight Disord - Stud Anorex Bulim Obes 2016;21:83–90. https://doi.org/10.1007/s40519-015-0210-3.

[44] Hazzard VM, Telke SE, Simone M, Anderson LM, Larson NI, Neumark-Sztainer D. Intuitive eating longitudinally predicts better psychological health and lower use of disordered eating behaviors: findings from EAT 2010–2018. Eat Weight Disord - Stud Anorex Bulim Obes 2021;26:287–94. https://doi.org/10.1007/s40519-020-00852-4.

[45] Xavier HV, Lopes TV, Gutzeit EM, Campos SCD, Stubs MB, Miranda GRB, et al. Avaliação da percepção dos familiares de acadêmicos de medicina, em relação a necessidade e a importância da vacinação contra a COVID-19. Res Soc Dev 2022;11:e30211728335. https://doi.org/10.33448/rsd-v11i7.28335.

[46] Hill D, Conner M, Clancy F, Moss R, Wilding S, Bristow M, et al. Stress and eating behaviours in healthy adults: a systematic review and meta-analysis. Health Psychol Rev 2022;16:280–304. https://doi.org/10.1080/17437199.2021.1923406.

[47] Evers C, Dingemans A, Junghans AF, Boevé A. Feeling bad or feeling good, does emotion affect your consumption of food? A meta-analysis of the experimental evidence. Neurosci Biobehav Rev 2018;92:195–208. https://doi.org/10.1016/j.neubiorev.2018.05.028.

INTUITIVE EATING REDUCED DIETARY RESTRAINT IN UNIVERSITY STUDENTS DURING THE COVID-19 PANDEMIC: A COHORT STUDY

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