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Factors associated with body image dissatisfaction in a Brazilian university sample during the COVID-19 pandemic

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We investigated the prevalence of body image dissatisfaction (BID) and associated factors among professors and undergraduate students in Brazil during the COVID-19 pandemic. Using Stunkard's Figure Rating Scale, BID was analyzed in a sample of 2,220 adults. The independent variables were sociodemographic, lifestyle, mental health symptoms, COVID-19-related factors, disordered eating, experience of weight stigma, and weight change concerns. We used a multinomial logistic regression analysis. The overall prevalence of BID was 82.5% (69.0% due to excess weight), with more professors dissatisfied by excess weight than undergraduate students (78.9% vs. 61.2%, $p<0.001$). In the adjusted model, being a young adult (PR, 1.201, 95% CI: 1.128; 1.279), married or in a stable union (PR, 1.088, 95% CI: 1.027; 1.152), reporting of binge eating episode (PR, 1.120, 95% CI: 1.068; 1.173), concern about weight gain (PR, 1.394, 95% CI: 1.310; 1,483), and experience of excess weight stigma (PR, 1.193, 95% CI: 1.141; 1.248) increased the prevalence of BID due to excess weight. While males (PR, 1.578, 95% CI: 1.328; 1.875), moderate to severe depressive symptoms (PR, 1.217, 95% CI: 1.011; 1.465), the concern of losing weight (PR, 1.494, 95% CI: 1.221; 1.830), and experience of low weight stigma (PR, 2.620, 95% CI: 2.093; 3.280) increased the prevalence of BID due to low weight. Different factors associated with BID were observed between students and professors. Bearing in mind the complexity of body image, it is essential to consider different public health interventions and the COVID-19 pandemic's influence on reducing BID among Brazilian adults, especially susceptible groups.

KEYWORDS

body image, universities, COVID-19, body dissatisfaction, adults

1. Introduction

Body image refers to the image we have in our minds of the size, form, and shape of our bodies, as well as our feelings concerning these characteristics and parts of the body (Slade, 1994). Body image perception can change throughout a person's lifespan, with influencing actions ranging from positive perception, satisfaction, and acceptance of body shape to negative feelings about the image, generating suffering as a result of physical appearance (McLean and

Paxton, 2019). In this context, body image dissatisfaction (BID) occurs when the perceived body image is not equivalent to that idealized (Grogan, 1999; Gleaves et al., 2000). BID is linked to the level of which socially accepted standards have been internalized (mainly thinness for women) and to social comparison processes. These important constructs can negatively influence affective self-evaluations (Paterna et al., 2021).

In studying body image among adults, there is a greater scientific interest in investigating dissatisfaction and its outcomes among university students. This fact occurs due to this group dealing with the difficulties of academic life, demanding high grades, and insecurity about the future (Souza and Alvarenga, 2016). Additionally, the age at which these students enter university adds various further elements resulting from leaving adolescence and beginning adult life, such as intense biological changes, psychosocial instability, the establishment of new social relationships, adoption of new behaviors, questioning values, beliefs, and attitudes (Brito et al., 2016). These aspects make students vulnerable to societal pressures regarding bodily attributes. Thus, university students are susceptible to ideals of body appearance and may seek them through physical exercise, diets, food restriction, and plastic surgeries, with adverse consequences.

Regarding older age groups, such as university professors, investigations are scarce, despite studies showing that body dissatisfaction remains stable throughout life (Lewis and Cachelin, 2001; Tiggemann and McCourt, 2013; Fallon et al., 2014) for both sexes (Quittkat et al., 2019). Although this group is not a priority target for research, body changes that occur with age, especially weight gain, decrease in muscle mass, increase in body fat, and the effect of chronic health conditions, can affect the image and the relationship with the body (Pruis and Janowsky, 2010). It is noteworthy that older people are still concerned about their appearance. Although they may not feel the same social pressure as younger people to be thin and beautiful, they maintain the adoption of diets, exercise, and other strategies to control weight (Tiggemann, 2004). Such information suggests that the investigation regarding body image in this population be expanded since body dissatisfaction persists throughout life (Quittkat et al., 2019).

It is noteworthy that body image perception is a complex phenomenon that involves cognitive, emotional, social, and cultural aspects. Also, dynamic interactions between the body and environmental factors that contribute to lifestyle behaviors as well as the academic environment can favor feelings about body size and shape (Silva et al., 2019; Tort-Nasarre et al., 2021). In 2020, due to the severe global health crisis caused by the coronavirus-2 disease (COVID-19) pandemic, interactions between the body and environment were modified because of the adoption of preventive strategies for virus transmission. Social isolation is implied in the suspension of in-person classes and work, the closure of public spaces, limited social interactions, and the change of the academic environment to virtual. In addition, the media and social networks emphasized social distancing during the pandemic as a determining factor for weight gain, as well as the role of obesity as a comorbidity risk for worsening COVID-19 (de Macêdo et al., 2022). Given this context of fear and weight variation, the emergence of body concern can be triggered, causing or aggravating body image dissatisfaction.

Moreover, the sudden change in routine, fear of illness, and isolation during the pandemic had deleterious effects on mental health. This in turn increased the probability of emotional eating and changes in sleeping patterns (Bonati et al., 2022), which may impact weight (van Strien et al., 2016; Konttinen et al., 2019; Konttinen, 2020) and, consequently, body image (Brytek-Matera et al., 2021). The presence of dissatisfaction, whether due to the conception that the current body does not satisfy the idealized image, or whether the pandemic favors health risks, can trigger the adoption of disordered eating behavior, affecting the quality of life (Sharpe et al., 2018). Mainly among the university community, the rapid transition to remote teaching and learning required digital competence, adaptation to digital environments, available technologies, and home working, which led to increased levels of psychological distress, weight gain, and affected the quality of life of professors and students (Almhdawi et al., 2021; Azzi et al., 2022).

A negative body image status can affect the quality of life since assessment of body image can trigger negative emotions toward body parts and their characteristics (Nayir et al., 2016; Medeiros de Morais et al., 2017). Additionally, BID can predict outcomes such as low self-esteem, depressive mood, and eating disorder symptoms (Sharpe et al., 2018). Given this, it is necessary to better understand the factors that may influence the occurrence of dissatisfaction, especially in different cultures and regions.

Although body image is influenced by the body's interaction with society and the environment (Silva et al., 2019) and although the pandemic has caused relevant social and environmental changes (Bonati et al., 2022), the assessment of factors that are associated with body image at this atypical time has been little examined. This is especially true in a large population sample of different age groups, such as university students and professors, who had to deal with unprecedented challenges to maintain academic activities. To the best of our knowledge, no previous studies have examined aspects associated with body dissatisfaction among university professors during the pandemic. Therefore, the present study aims to fill this research gap by analyzing factors associated with body image dissatisfaction in a sample of Brazilian university professors and students during social isolation due to the COVID-19 pandemic.

First, based on the previous findings described above, we predicted that the prevalence of body dissatisfaction would be higher among students compared to professors (hypothesis 1). Second, demographic, lifestyle, and socioeconomic factors would remain associated with dissatisfaction with body image, similar to studies carried out before the pandemic (hypothesis 2). However, according to the studies mentioned above, aspects related to mental health, weight stigma, and eating behavior during this period could be more relevant to dissatisfaction with body image (hypothesis 3). Finally, we hypothesize that aspects related to the COVID-19 pandemic could negatively influence body image, given the changes in daily routine imposed by social isolation (hypothesis 4).

2. Methods

This cross-sectional study is part of a prospective longitudinal cohort named COCASa - Online Cohort on Food Behavior and Mental Health. COCASa aims to assess the influence of the COVID-19 pandemic on the emotional distress (depression, anxiety, and stress) and eating behavior of professors and undergraduate students from universities in five regions of Brazil. Two-stage baseline evaluation

occurred from July to December 2020 and included 3,160 participants (1,839 undergraduate students and 1,321 professors), who were followed bi-monthly for 24 months with nine waves of questionnaires. The study was registered under protocol number 4.125.928, according to the National Health Council Resolution 466/2012 for research in humans and the guidelines issued by the National Research Ethics Commission to conduct studies during the pandemic (Brasil, Ministério da Educação, 2020a). The participants declared that they had read the Informed Consent Form (ICF) and they marked an icon representing informed agreement to participate. All participants received a copy of the ICF by email.

Because of social distancing due to the COVID-19 pandemic, the study adopted non-probabilistic sampling since the recruitment of individuals who were considered eligible to participate was done through email and social networks. Data were collected through a questionnaire in SurveyMonkey. Further information about the methodological aspects, study population, and sample calculation of the COCASa study are described in De Santana et al. (2021).

Eligible participants for this study were undergraduate students and professors of in-person courses, over 18 years of age, of both sexes, from universities that followed social isolation measures with the suspension of in-person academic activities. Pregnant or breastfeeding women, children, adolescents, people with a medical history of eating disorders, or students and professors who were, respectively, studying or working in person or enrolled in distance learning education courses were not included in this study.

The present study included 2,220 participants (1,245 undergraduate students and 975 professors) with complete information on demographics, socioeconomic, lifestyle, emotional distress, eating behaviors, COVID-19, and body image.

2.1. Measures

The Stunkard scale, developed by Stunkard et al. (1983) and validated for women by Scagliusi et al. (2006) and for men by Conti et al. (2013), was used to evaluate body image (outcome). This instrument consists of 18 schematic images, nine female and nine male silhouettes, ranging from very thin (number 1) to very obese (number 9). The participants received written guidance to inform the number of figures representing their current body and the body they would like to have, that is, the ideal. Body image dissatisfaction was obtained by the difference between the number of idealized and current body figures. The obtained values vary from − 8 to + 8. Zero scores indicated no body dissatisfaction; positive values reflected dissatisfaction due to low weight, while negative values reflected dissatisfaction due to excess weight.

The independent variables were self-declared by the respondents. They included: family income (up to R$ 10,000.00 or more than R$ R$ 10,000.00), age (up to 30 years or more than 30 years), biological sex (female or male), race/skin color (white, black, or other), and marital status (married/in a stable union or single/divorced). Participants were also questioned about their physical activity during the pandemic (present or absent), concerns about weight variation (gain or loss), and if they had experienced discrimination or harassment because of weight (stigma for being overweight or stigma for being underweight). The frequency of sleep difficulties was categorized as infrequent (1–3 days per week) or frequent (4 or more days per week).

Considering the study period, participants were asked about COVID-19 infection (yes or no), COVID-19 diagnosis in a family member or close person (yes or no), and adherence to social isolation (partial or total). Regarding concern about coronavirus consequences on health, participants' responses were categorized as presence (extremely, much, and more or less concerned) or absence of concern (not too much and not at all concerned).

Risk behaviors for eating disorders were evaluated using an adapted version of the Eating Disorder Examination (EDE) questionnaire developed by Hay (1998), adapted to a Brazilian version by Ferreira and Da Veiga (2008). The adapted questionnaire was previously validated for its reliability, which indicated that it could be more effective in investigating less frequent behaviors (Ferreira and Da Veiga, 2008). It has already been adopted in Brazilian investigations with a similar population to our study (de Carvalho et al., 2017; Pena Gralle et al., 2017; De Oliveira et al., 2019; de Matos et al., 2021). Three risk behaviors for eating disorders were evaluated using this scale, namely: binge eating (the act of ingesting large amounts of food at once with the feeling of loss of control at the time of ingestion), purgative (use of laxatives, diuretics, or self-induced vomiting), and food restriction (fasting or restrictive diet). A frequency of at least once a week for any risk behaviors in the last 3 months was considered positive.

Also, to evaluate symptoms of depression, anxiety, and stress in the last week, we used the reduced version of the Depression, Anxiety, Stress Scale (DASS-21; Lovibond and Lovibond, 1995). The scale presents adequate validity and reliability to assess negative affectivity in university students (Martins et al., 2019), as well as adapted and validated for Brazilian adults (Vignola and Tucci, 2014). The symptoms of depression, anxiety, and stress were classified according to the score obtained in five categories: normal, mild, moderate, severe, and extremely severe, and for analysis, categorized from normal to mild and from moderate to extremely severe.

2.2. Statistical analysis

Absolute and relative frequencies were calculated for the descriptive analysis. Students and professors' characteristics were compared using the Pearson Chi-square test (Rosner, 2010). In the current study, the DASS-21 exhibited excellent reliability ($\alpha = 0.955$) and the Hay Scale to assess disordered eating presented moderate reliability ($\alpha = 0.519$).

Multinomial regression was adopted to assess the association between BID for excess or low weight and the independent variables. Initially, a univariate model was built, with independent variables tested separately from the outcomes. The variables that presented value of *p*s less than 20% in the first stage were selected to compose the multiple models. These variables were included together in the analysis, and the final model was composed of variables whose association presented value of ps less than 5% for body image dissatisfaction in terms of excess or low weight. To test our hypotheses, regression analyses were performed using the entire sample and separately for students and professors. After multinomial regression, all OR values were converted to Prevalence Ratio (PR) and their corresponding 95% confidence intervals

(95%CI) using the PR estimator proposed by Bastos et al. (2015). This transformation was necessary because our study is cross-sectional, in which the prevalence of the outcome of interest is greater than 10%. The AIC (Akaike Information Criterion) was used to assess the quality of the final model. The lower its value, the better the fit (Akaike, 1998). All analyses were performed using the R studio 4.0.0 statistical program.

3. Results

3.1. Characterization of participants and prevalence of BID

The characteristics of the study participants are shown in Table 1. It was observed that 82.5% of the participants had body image dissatisfaction, and 69% related their dissatisfaction to excess weight (Figure 1). A significant difference was observed between students and professors in the prevalence of body image dissatisfaction ($p < 0{,}001$). The majority (71.7%) of participants were female, 53.6% were aged over 30 years, 60.7% were white, approximately half (50.9%) practized physical activity, and 36.4% related binge eating episodes. Also, almost half (55.6%) of the student sample belonged to the socioeconomic stratum below R$ 10,000.00, and 64.2% of professors had a monthly income of more than R$ 10,000.

3.2. Associated factors to body image dissatisfaction

The analysis results between the associated factors and BID are shown in Table 2 for the total sample and separately for students (Table 3) and professors (Table 4). In the adjusted model for the total sample, being a young adult (PR: 1.201, 95% CI: 1.128; 1.279), married or in a stable union (PR: 1.088, 95% CI: 1.027; 1.152), report of binge eating episodes (PR: 1.120, 95% CI: 1.068; 1.173), concern about weight gain during the pandemic (PR: 1.394, 95% CI: 1.310; 1,483), and experience of excess weight stigma (PR: 1.193, 95% CI: 1.141; 1.248) increased the prevalence of BID due to excess weight. While being male (PR: 1.578, 95% CI: 1.328; 1.875), moderate to severe depressive symptoms (PR: 1.217, 95% CI: 1.011; 1.465), concern about losing weight during the pandemic (PR: 1.494, 95% CI: 1.221; 1.830), and experience of low weight stigma (PR: 2.620, 95% CI: 2.093; 3.280) increased the prevalence of BID due to low weight in the adjusted model. The factors that reduced the prevalence can be observed in Table 2.

The adjusted models revealed that students aged under 30 years, married or in a stable union had, respectively, 12% (PR: 1.123; 95% CI: 1.026–1.233) and approximately13% (PR: 1.128; 95% CI: 1.029–1.237) higher prevalence of having BID due to excess weight. It was also observed that students that related binge eating episodes had a 1.140 (95% CI: 1.063–1.224) higher prevalence of BID because of excess weight compared to their peers. The prevalence of BID because of excess weight for students who were concerned about weight gain during the pandemic increased by 67% (PR: 1.669; 95% CI: 1.495–1.864) and those who experienced stigma due to being overweight by 22% (PR: 1.224; 95% CI: 1.140–1.315). However, students concerned about weight loss (PR: 0.262; 95% CI: 0.113–0.610) and those who experienced stigma because of their low weight (PR: 0.356; 95% CI: 0.273-0.466) reduced the prevalence of BID because of excess weight.

Professors who had binge eating episodes, who were concerned about weight gain, and who experienced stigma due to being overweight had, respectively, 1.126 (95% CI: 1.065–1.191), 1.213 (95% CI: 1.129–1.302), and 1.124 (95% CI: 1.069 – 1.183) higher prevalence of BID because of excess weight. However, among professors who experienced stigma because of their low weight, a lower prevalence of BID due to excess weight was identified (PR: 0.572; 95% CI: 0.431–0.758).

When analysis for BID related to low weight was performed, being a male student and concern about weight loss increased the prevalence of BID because of low weight by 45% (PR: 1.450; 95% CI: 1.218–1.726) and 34% (PR: 1.341; 95% CI: 1.111–1.620), respectively. Students who experienced stigma due to low weight had a 2.408 (95% CI: 1.929–3.006) higher prevalence of BID due to low weight. On the other hand, students aged under 30 years (PR: 0.534; 95% CI: 0.348–0.821), with binge eating episodes (PR: 0.789, 95% CI: 0.637–0.979), concerned with weight gain (PR: 0.247; 95% CI: 0.167–0.366), and those who experienced stigma because of excess weight (PR: 0.227; 95% CI: 0.119 – 0.435) had a lower prevalence of BID due to low weight.

In the adjusted model for BID because of low weight in professors, it was identified that being male and experiencing stigma because of low weight increased the prevalence for this outcome by 183% (PR: 2.832; 95% CI: 1.614–4.971) and 496% (PR: 5.963; 95% CI: 3.233–10.999), respectively. However, professors concerned about weight gain (PR: 0.387; 95% CI: 0.179-0.835) were less likely to have BID due to low weight.

4. Discussion

This study identified the elevated prevalence of BID in both evaluated groups. Associations between demographic, emotional, and behavioral factors as well as body image dissatisfaction among Brazilian professors and students from universities during the COVID-19 pandemic were observed.

Different from our first hypothesis, the prevalence of BID was higher in the professor group; among them, 78.9% were dissatisfied due to excess weight. Estimates of dissatisfaction greater than 70% were observed among Mexican adults during the pandemic (Pineda-García et al., 2021) and the Brazilian university community in the pre-pandemic period (Albuquerque et al., 2021).

As predicted in our second hypothesis, aspects such as demographic, lifestyle, and socioeconomic factors remained associated with BID, similar to those observed before the pandemic. Regarding the demographic variables, students aged under 30 years were associated with BID because of excess weight. Younger adults experience crucial transitions such as increased autonomy, financial independence, and employment, and experience changes in interpersonal influences that are relevant to identity development (Nelson et al., 2008), which can influence self-perception, values, and body image ideals. Some studies observed a positive association between being younger and a greater tendency for BID (Mello and Rech, 2013). However, among professors, it was identified that being under 30 years of age reduced the prevalence of BID due to low weight. This result can be explained by younger individuals having a greater desire for a lean body. In addition, the sample was mainly composed

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TABLE 1 Characteristics of the participants.

	Total	Students	Professors	*p*-value
	n (%)	*n* (%)	*n* (%)	
	2,220 (100)	1,245 (56.1)	975 (43.9)	
Sex				
Female	1,592 (71.7)	942 (75.7)	650 (66.7)	<0.001
Male	628 (28.3)	303 (24.3)	325 (33.3)	
Age				
<30 years	1,031 (46.4)	1,009 (81.0)	22 (2.3)	<0.001
≥30 years	1,189 (53.6)	236 (19.0)	953 (97.7)	
Race/Color				
White	1,347 (60.7)	647 (52.0)	700 (71.8)	<0.001
Black	822 (37.0)	570 (45.8)	252 (25.8)	
Yellow and indigens	51 (2.3)	28 (2.2)	23 (2.4)	
Marital status				
Single or divorced	1,342 (60.5)	1,041 (83.6)	301 (30.9)	<0.001
Married or in a stable union	878 (39.5)	204 (16.4)	674 (69.1)	
Family income (R$)				
<10,000/month	1,484 (66.8)	1,135(91.2)	349 (35.8)	<0.001
≥10,000/month	736 (22.2)	110 (8.8)	626 (64.2)	
Sleep difficulty				
<4 weekdays	1893 (85.3)	1,013 (81.4)	880 (90.3)	<0.001
4 or more weekdays	327 (14.7)	232 (18.6)	95 (9.7)	
Physical activity				
Not Active	1,091 (49.1)	676 (54.3)	415 (42.6)	<0.001
Active	1,129 (50.9)	569 (45.7)	560 (57.4)	
Depressive symptoms				
Normal to minimum	1,377 (62.0)	642 (51.6)	735 (75.4)	<0.001
Moderate to severe	843 (38.0)	603 (48.4)	240 (24.6)	
Anxiety symptoms				
Normal to minimum	1,413 (63.6)	656 (52.7)	757 (77.6)	<0.001
Moderate to severe	807 (36.4)	589 (47.3)	218 (22.4)	
Stress symptoms				
Normal to minimum	1,356 (61.1)	655 (52.6)	702 (72.0)	<0.001
Moderate to severe	863 (38.9)	590 (47.4)	273 (28.0)	
COVID-19 concern				
Absent	225 (10.1)	133 (10.7)	92 (9.4)	0.334
Present	1995 (89.9)	1,112 (89.3)	883 (90.6)	
Social isolation				
Absent or partial	1,559 (70.2)	917 (73.7)	642 (65.8)	<0.001
Total	661 (29.8)	328 (26.3)	333 (34.2)	
COVID-19 diagnosis				
Yes	101 (4.5)	59 (4.7)	42 (4.3)	0.682
No	2,119 (95.5)	1,186 (95.3)	933 (95.7)	
Relatives with COVID-19				
Yes	1,127 (50.8)	672 (54.0)	455 (46.7)	0.001

(Continued)

TABLE 1 (Continued)

	Total	Students	Professors	*p*-value
	n (%)	*n* (%)	*n* (%)	
No	1,093 (49.2)	573 (46.0)	520 (53.3)	
Binge eating episode				
<1/week	1,413 (63.6)	747 (60.0)	666 (68.3)	<0.001
1 or more per week	807 (36.4)	498 (40.0)	309 (31.7)	
Restrictive diet or fasting				
<1/week	1806 (81.4)	961 (77.2)	845 (86.7)	<0.001
1 or more per week	414 (18.6)	284 (22.8)	130 (13.3)	
Purgatives				
<1/week	2,125 (95.7)	1,188 (95.4)	937 (96.1)	0.461
1 or more per week	95 (4.3)	57 (4.6)	38 (3.9)	
Weight change				
Not concerned	949 (42.7)	509 (40.9)	440 (45.1)	<0.001
Concerned about gain	1,184 (53.3)	663 (53.3)	521 (53.4)	
Concerned about loss	87 (3.9)	73 (5.9)	14 (1.4)	
Weight stigma				
No stigma experienced	1,223 (55.1)	550 (44.2)	673 (69.0)	<0.001
Excess weight	673 (30.3)	435 (34.9)	238 (24.4)	
Low weight	324 (14.6)	260 (20.9)	64 (6.6)	

R$, real.

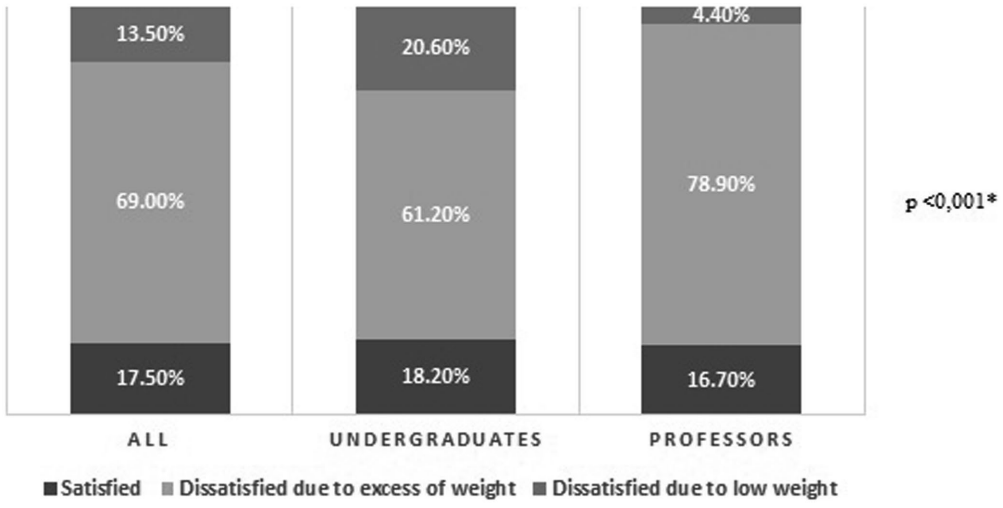

FIGURE 1
Prevalence of body image satisfaction and dissatisfaction in undergraduates and professors at Brazilian universities. *Chi-squared analysis.

of women, for whom the literature emphasizes that this is the desired appearance (Quittkat et al., 2019).

Another relevant factor recorded in this research was that, among married students or those in a stable union, the prevalence of BID because of excess weight increased, but not with low weight. Family factors have been established as determinants of body image satisfaction. Investigations have identified that married people can suffer comments and negative evaluations from their partner focusing on the body, and these are significant predictors for BID (Pole et al., 2004; Birmingham et al., 2021).

Several investigations that studied BID involved mostly females (Hogue and Mills, 2019; Kops et al., 2019). However, the present study identified an association between males and BID for low weight. Studies suggest cross-cultural differences in body image ideals between women and men. For females, the standard of beauty is related to lean body weight and shape (Da Silva et al., 2011; Yahia

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TABLE 2 Prevalence and factors associated with body image dissatisfaction among the total sample during the COVID-19 pandemic.

	Body image dissatisfaction							
	Excess weight				Low weight			
	Crude		Adjusted		Crude		Adjusted	
	PR	95% CI	PR	95% CI	PR	95% CI	PR	95% CI
Male	0.965	(0,905; 1,020)	0,981	(0.930; 1.035)	**1.714**	**(1.387; 2.117)**	**1.578**	**(1.328; 1.875)**
<30 years	**1.342**	**(1.264; 1.424)**	**1.201**	**(1.128; 1.279)**	**0.217**	**(0.165; 0.284)**	**0.344**	**(0.250; 0.474)**
White	1.043	(0.864; 1.259)			0.790	(0.390; 1.598)		
Black	0.943	(0.778; 1.143)			1.303	(0.645; 2.633)		
Married or in a stable union	**1.284**	**(1.217; 1.355)**	**1.088**	**(1.027; 1.152)**	**0.320**	**(0.241; 0.427)**	0.836	(0.617; 1.132)
≥ R$ 10,000/month	**1.226**	**(1.162; 1.294)**			**0.292**	**(0.211; 0.406)**		
Frequent sleep difficulty (≥ 4 days/week)	1.034	(0.958; 1.115)			**1.358**	**(1.043; 1.767)**		
Active	0.953	(0.901; 1.007)	**0.924**	**(0.881; 0.969)**	**0.709**	**(0.573; 0.878)**	0.872	(0.732; 1.040)
Moderate to severe depressive symptoms	1.047	(0.989; 1.108)	1.039	(0.988; 1.092)	**1.633**	**(1.325; 2.014)**	**1.217**	**(1.011; 1.465)**
Moderate to severe anxiety symptoms	**1.077**	**(1.018; 1.139)**			**1.339**	**(1.084; 1.654)**		
Moderate to severe stress symptoms	**1.097**	**(1.037; 1.159)**			1.219	(0.986; 1.506)		
Presence of COVID-19 concern	**1.112**	**(1.001; 1,235)**			0.882	(0.635; 1.226)		
Total social isolation	1.022	(0.963; 1.086)			0.995	(0.790; 1.253)		
COVID-19 diagnosis	0.913	(0.813; 1.024)			1.541	(0.819; 2.901)		
Relatives with COVID-19	1.006	(0.951; 1.064)			0.878	(0.711; 1.085)		
Binge eating episode	**1.341**	**(1.273; 1.413)**	**1.120**	**(1.068; 1.173)**	**0.292**	**(0.211; 0.406)**	**0.787**	**(0.636; 0.974)**
Restrictive diet or fasting	**1.274**	**(1.207; 1.345)**			**0.379**	**(0.253; 0.568)**		
Purgatives	**1.299**	**(1.201; 1.404)**			**0.226**	**(0.074; 0.691)**		
Concern about gain weight	**1.762**	**(1.649; 1.882)**	**1.394**	**(1.310; 1,483)**	**0.127**	**(0.091; 0.176)**	**0.276**	**(0.196; 0.390)**
Concern about losing weight	**0.161**	**(0.090; 0.289)**	**0.332**	**(0.189; 0.582)**	**6.387**	**(5.339; 7.641)**	**1.494**	**(1.221; 1.830)**
Excess weight stigma	**1.531**	**(1.460; 1.605)**	**1.193**	**(1.141; 1.248)**	**0.096**	**(0.054; 0.169)**	**0.238**	**(0.132; 0.429)**
Low weight stigma	**0.280**	**(0.228; 0.346)**	**0.402**	**(0.328; 0.492)**	**7.652**	**(6.293; 9.306)**	**2.620**	**(2.093; 3.280)**

R$, real. Bold values: $p < 0.05$.

et al., 2011; Hernández et al., 2012), whereas for men, the BID is centered on muscularity (Brianne, 2014; Mayo and George, 2014). However, this aspect was not investigated in this study. Nevertheless, men experience a cultural change in terms of body worship, with an increased drive for molded, muscular, and thin bodies. This tendency makes males susceptible to vulnerable comparisons with images of unreal bodies, which may increase the occurrence of BID by low weight among students and professors, as identified in this study (Fontes et al., 2012).

It is also noteworthy that instruments focusing on satisfaction regarding weight and body shape based on fat (and, consequently, concern with low weight) tend to point to a higher prevalence of body image disorder in women (Cafri and Thompson, 2004). In this sense, considering the specificities of the male body image, de Carvalho and Ferreira (2014) highlight the importance of identifying appropriate scales for each population, because, regarding men, it is necessary to choose an evaluative instrument that measures the concern and dissatisfaction regarding muscle tone.

Among the variables investigated for possible associations with BID, being concerned about weight gain/loss, weight stigma, disordered eating, and psychological distress were positively associated with this outcome among professors and students, as we expected in our third hypothesis. The observed association may be caused by fear of weight gain, mainly because of increased stigmatizing messages conveyed by the media, scientists, and the general public regarding the risks of being overweight or weight gain and comorbidities associated with COVID-19 (Wang et al., 2021; Dubin et al., 2022). An increased weight can promote frustration with the body, disappointment, comparisons, and non-acceptance for not reaching an ideal weight. Together, these feelings contribute to the occurrence of dissatisfaction with one's own body, causing a feeling of inadequacy and estrangement from the pursuit of an ideal body (Jiotsa et al., 2021). Nonetheless, it has been suggested that people with a nutritional status of low weight, predominantly female, suffering less stigma, and the achievement of a socially desired esthetic standard may present a reduction in BID (Martins et al., 2012).

The coronavirus-2 pandemic led to changes in daily routines and restrictions on activities, distancing, and social isolation in order to control the spread of the virus (Brasil, Ministério da Saúde, 2020b). In Brazil, such measures involved the transition from in-person classes to the development of remote education, thus allowing the continuance of the academic activities of professors and university students (Brasil, Ministério da Saúde, 2020c). However, this context favored changes in daily routines such as physical activity (Robertson et al., 2021) and eating behavior (Giel et al., 2021; González-Monroy et al., 2021), and exposed people to several stressors such as

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TABLE 3 Prevalence and factors associated with body image dissatisfaction among university students during the COVID-19 pandemic.

	Body image dissatisfaction							
	Excess weight				Low weight			
	Crude		Adjusted		Crude		Adjusted	
	PR	95% CI	PR	95% CI	PR	95% CI	PR	95% CI
Male	**0.873**	**(0.780; 0.977)**	**0.970**	**(0.888; 1.059)**	**1.885**	**(1.518; 2.340)**	**1.450**	**(1.218; 1.726)**
<30 years	**1.294**	**(1.182; 1.416)**	**1.123**	**(1.026; 1.233)**	**0.341**	**(0.219; 0.533)**	**0.534**	**(0.348; 0.821)**
White	1.114	(0.804; 1.544)			0.858	(0.415; 1.777)		
Black	1.025	(0.739; 1.424)			1.080	(0.523; 2.231)		
Married or in a stable union	**1.282**	**(1.167; 1.409)**	**1.128**	**(1.029; 1.237)**	**0.454**	**(0.298; 0.691)**	0.727	(0.500; 1.058)
≥ R$ 10,000/month	1.044	(0.899; 1.211)			0.824	(0.539; 1.259)		
Frequent sleep difficulty (≥ 4 days/week)	**1.133**	**(1.023; 1.255)**			1.081	(0.824; 1.418)		
Active	**0.967**	**(0.885; 1.058)**			**0.769**	**(0.615; 0.962)**		
Moderate to severe depressive symptoms	**1.164**	**(1.065; 1.272)**	**1.074**	**(1.000; 1.152)**	1.216	(0.977; 1.512)	**1.218**	**(1.018; 1.457)**
Moderate to severe anxiety symptoms	**1.224**	**(1.121; 1.337)**			0.960	(0.772; 1.195)		
Moderate to severe stress symptoms	**1.220**	**(1.117; 1.333)**			0.942	(0.757; 1.173)		
Presence of COVID-19 concern	1.129	(0.961; 1.326)			0.905	(0.647; 1.266)		
Total social isolation	0.948	(0.855; 1.052)			1.241	(0.983; 1.566)		
COVID-19 diagnosis	**0.832**	**(0.707; 0.978)**			1.777	(0.879; 3.593)		
Relatives with COVID-19	0.960	(0.878; 1.050)			0.980	(0.788; 1.220)		
Binge eating episode	**1.484**	**(1.363; 1.617)**	**1.140**	**(1.063; 1.224)**	**0.457**	**(0.350; 0.596)**	**0.789**	**(0.637; 0.979)**
Restrictive diet or fasting	**1.509**	**(1.395; 1.632)**			**0.301**	**(0.197; 0.461)**		
Purgatives	**1.495**	**(1.352; 1.653)**			**0.163**	**(0.042; 0.641)**		
Concern about gain weight	**2.417**	**(2.153; 2.714)**	**1.669**	**(1.495; 1.864)**	**0.112**	**(0.077; 0.162)**	**0.247**	**(0.167; 0.366)**
Concern about losing weight	**0.106**	**(0.045; 0.247)**	**0.262**	**(0.113; 0.610)**	**4.371**	**(3.646; 5.242)**	**1.341**	**(1.111; 1.620)**
Excess weight stigma	**1.932**	**(1.781; 2.095)**	**1.224**	**(1.140; 1.315)**	**0.075**	**(0.040; 0.140)**	**0.227**	**(0.119; 0.435)**
Low weight stigma	**0.227**	**(0.172; 0.298)**	**0.356**	**(0.273; 0.466)**	**5.851**	**(4.744; 7.217)**	**2.408**	**(1.929; 3.006)**

R$, real. Bold values: $p < 0.05$.

increased depression (Jungmann and Witthöft, 2020; van Rheenen et al., 2020).

Regular media messages throughout the pandemic period, regarding the positive and consistent benefits of physical activity for mental health and the reduction of COVID-19 harm, encouraged individuals to engage in physical activity. As observed in this study, physical activity was a factor associated with a lower BID because of excess weight among university students. An increase in physical activity can represent a strategy for coping with the pandemic, but also one for improvement in healthy behavior, or even to reflect changes related to concerns with body weight/shape and potential complications of COVID-19. This practice can favor benefits in the quality of life, physical and psychological well-being, and lower BID (Silva and Nunes, 2014; Robertson et al., 2021).

In this study, an association between binge eating and BID among students and professors was also identified, which agrees with other investigations that found that during the COVID-19 pandemic, there was a change in individuals' behavior (Giel et al., 2021; González-Monroy et al., 2021). Increased food intake and BID were associated with an adaptive coping strategy for COVID-19, suggesting that some people may turn to food in times of anxiety, especially if they tend to eat more in response to their emotions (Michels et al., 2020; Coulthard et al., 2021). Healthy eating is a significant determinant of health. Understanding changes in eating behavior should be an intervention factor for preventing illness and for promoting health during and after the pandemic (Bertrand et al., 2021).

Nevertheless, the restrictive measures put in place during the COVID-19 outbreak led university students and professors to continue their activities online and indoors. This transformation can lead to adverse psychological consequences such as depression in response to a threat (Jungmann and Witthöft, 2020; Van Rheenen et al., 2020). The World Health Organization warns that at least one-third of the population exposed to a pandemic may suffer psychopathological manifestations according to the magnitude of the event and their degree of vulnerability (World Health Organization, 2006). In this study, we observed an association between moderate and severe symptoms of depression and BID. Moreover, research on the pandemic reported that depression is strongly related to emotional regulation. When depression is associated with BID concerning weight, it can be an emotional change due to health deterioration related to the risk of illness and the worsening of COVID-19, as well as a result of changes in daily routines, increasing the more significant concerns with weight changes and body shape (Michels et al., 2020; Coulthard et al., 2021; Haghshomar et al., 2022).

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TABLE 4 Prevalence and factors associated with body image dissatisfaction among university professors during the COVID-19 pandemic.

	Body image dissatisfaction							
	Excess weight				Low weight			
	Crude		Adjusted		Crude		Adjusted	
	PR	95% CI	PR	95% CI	PR	95% CI	PR	95% CI
Male	0.992	(0.926; 1.063)	1.004	(0.941; 1.072)	2.526	(1.405; 4.544)	**2.832**	**(1.614; 4.971)**
<30 years	1.086	(0.839; 1.406)			0.473	(0.122; 1.834)		
White	0.955	(0.788; 1.156)			0.887	(0.126; 6.249)		
Black	0.951	(0.780; 1.160)			1.369	(0.189; 9.903)		
Married or in a stable union	**1.093**	**(1.013; 1.180)**			1.154	(0.601; 2.215)		
≥ R$ 10,000/month	**1.091**	**(1.016; 1.173)**			0.441	(0.245; 0.794)		
Frequent sleep difficulty (≥ 4 days/week)	1.001	(0.897; 1.117)			1.502	(0.651; 3.466)		
Active	**0.883**	**(0.828; 0.940)**	**0.896**	**(0.844; 0.952)**	**1.133**	**(0.623; 2.061)**	1.243	(0.682; 2.264)
Moderate to severe depressive symptoms	**1.076**	**(1.005; 1.153)**			1.327	(0.704; 2.502)		
Moderate to severe anxiety symptoms	**1.092**	**(1.019; 1.170)**			1.194	(0.612; 2.329)		
Moderate to severe stress symptoms	**1.097**	**(1.028; 1.172)**			1.114	(0.590; 2.104)		
Presence of COVID-19 concern	1.074	(0.947; 1.218)			1.016	(0.371; 2.779)		
Total social isolation	1.043	(0.976; 1.115)			0.584	(0.292; 1.171)		
COVID-19 diagnosis	1.004	(0.854; 1.180)			0.923	(0.231; 3.687)		
Relatives with COVID-19	1.015	(0.951; 1.084)			0.835	(0.466; 1.499)		
Binge eating episode	**1.269**	**(1.199; 1.343)**	**1.126**	**(1.065; 1.191)**	**0.419**	**(0.189; 0.931)**	0.715	(0.307; 1.666)
Restrictive diet or fasting	**1.097**	**(1.013; 1.187)**			0.488	(0.153; 1.553)		
Purgatives	1.106	(0.973; 1.257)			0.587	(0.083; 4.153)		
Concern about gain weight	**1.326**	**(1.235; 1.423)**	**1.213**	**(1.129; 1.302)**	**0.231**	**(0.112; 0.476)**	**0.387**	**(0.179; 0.835)**
Excess weight stigma	**1.273**	**(1.207; 1.342)**	**1.124**	**(1.069; 1.183)**	**0.151**	**(0.037; 0.620)**	0.339	(0.083; 1.379)
Low weight stigma	**0.518**	**(0.388; 0.691)**	**0.572**	**(0.431; 0.758)**	**6.872**	**(3.827; 12.339)**	**5.963**	**(3.233; 10.999)**

R$, real. Bold values: $p < 0.05$.

Unlike our fourth hypothesis, no associations were observed concerning COVID-19 aspects, such as COVID-19 infection, COVID-19 diagnosis in a family member or close person, adherence to social isolation, or every category of body image dissatisfaction in the studied population. A possible explanation for this finding may be related to a non-direct association between BID and COVID-19 aspects, as observed in the study of Pineda-García et al. (2021).

The present study has limitations. First, the version of Hay (1998) was validated with good reliability for Brazilian adolescents. In this study, only the perceptive dimension of body image was evaluated, which requires caution when interpreting results related to body dissatisfaction since it is a multidimensional construct. It is essential to highlight that the Stunkard et al. (1983) scale presents variations in bodies ranging from very thin to very obese. Obesity is far from the muscular ideal generally presented as a current body reference among men and increasingly among women, presenting a limitation of our study. Finally, the cross-sectional design of this study precludes any causal inference, and even with the national makeup of the sample, it was not representative of individual regions of the country. The strengths of this research are that it addressed demographic, behavioral, and psychological factors during the pandemic among university students and professors who are considered vulnerable groups in terms of psychic suffering. This differs from most investigations on COVID-19, which are focused on health professionals, patients, children, and the general population (Xie et al., 2020). Information on BID for older adults is scarce, and the results presented here contribute to a better comprehension of the dissatisfaction among this group.

In conclusion, high estimates of BID due to excess weight were observed in a large sample of professors and students from Brazilian universities during the pandemic. A positive association was observed between demographic, behavioral, and emotional factors and body image dissatisfaction. Considering that a person's body image includes thoughts and feelings about appearance, how appearance impacts various aspects of life, and how they treat the body, the presence of BID can adversely affect their mental and physical health. Identifying potential associated factors can be the target of campaigns reinforcing the importance of healthy behaviors. Weight-related issues can help improve the perception of a healthy body, decreasing the individuals' dissatisfaction with their bodies. This study stands out because it provides advancement in knowledge of factors associated with body image. It may contribute to developing interventions, policies, and approaches focusing on preventing body image disorders and harmful physical and mental health consequences.

Data availability statement

The datasets presented in this article are not readily available because It is a current study and dataset will be used by researches to produce others papers. Requests to access the datasets should be directed to gp.casa@ufba.br.

Ethics statement

The studies involving human participants were reviewed and approved by School of Nutrition Ethics Committee from the Federal University of Bahia. The patients/participants provided their written informed consent to participate in this study.

Author contributions

CC and MLS conceived the study. EP, MCS, HS, and LS drafted the manuscript, which was critically reviewed and revised by CC and MLS. The data were analyzed by EB and LS. All authors provided approval for the publication of the content.

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Conflict of interest

The authors declare that the research was conducted without any commercial or financial relationships that could be construed as a potential conflict of interest.

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