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Exploring the perceptions of obesity, health habits, stigma, and eating behaviors in Brazil

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Abstract

Background Obesity is a chronic and complex disease influenced by various factors that hinder weight loss and maintenance. However, perceptions of obesity are often marked by stigma. This study assessed perceptions of obesity, weight stigma, health habits, and emotional eating in a representative sample of the Brazilian population.

Methods This cross-sectional study included a representative sample of 2560 Brazilian participants. Data were collected from structured online questionnaires covering demographic aspects, perceptions of obesity, stigma, health habits, and behaviors related to emotional eating.

Results The prevalence of obesity in the sample was 26%. However, 61% of these individuals did not receive a formal diagnosis. Although 76% of the participants considered obesity a disease, 65% believed that diet and exercise were sufficient treatments. Only 5% of the participants with obesity considered 10% weight loss beneficial for associated comorbidities. It was widely believed that normalizing body mass index (BMI) is necessary for positive health outcomes. Emotional eating behaviors were slightly more prevalent among individuals with obesity (25%) but were present across all BMI ranges.

Conclusions The findings of this investigation underscore the necessity for comprehensive education regarding obesity as a complex multifactorial condition. They emphasize the importance of promoting awareness of the benefits associated with modest weight reduction, improving the diagnosis and documentation of obesity in clinical settings, and implementing targeted interventions to address misconceptions concerning treatment modalities and the impact of emotional eating behaviors.

Keywords Weight loss, Emotional eating, Weight bias, Obesity treatment

Introduction

Obesity is a chronic and relapsing disease, with multiple complex factors involved in weight regulation, making weight loss and maintenance challenging [1]. While regular exercise and a balanced diet are important factors for maintaining health, research indicates limited effects on weight loss and long-term weight maintenance [2, 3, 4, 5]. Additional treatments, such as pharmacotherapy and bariatric surgery, are often required, and they are well-studied and evidence-based [6, 7, 8, 9].

Nonetheless, obesity itself and its treatment are highly stigmatized. The public's perception of obesity and its

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management can impact how it is addressed and perceived [10, 11, 12, 13, 14]. To address this, clear criteria for defining clinical obesity have been proposed [15]. Despite these efforts, stigma surrounding treatment methods, such as pharmacotherapy and surgery, along with pervasive weight bias, remain significant challenges. These factors can contribute to the low adoption of these treatments and poor long-term adherence.

Weight bias and discrimination directed at individuals with obesity can lead to the internalization of stigma, the adoption of emotional eating as a coping mechanism, a tendency to avoid physical activity, and an increased risk of developing various chronic health conditions [12, 16, 17].

The public's perceptions of obesity, the degree of weight stigma, and their impact on social and individual factors can vary in different cultures and populations. The vast majority of data come from high-income countries; data from lower- to middle-income countries from different regions of the world is, in this sense, imperative and recommended by the World Obesity Federation to enhance global research on the topic [13].

To date, no investigation has assessed the beliefs of a significant portion of the Brazilian population regarding obesity, its treatment, and the stigma associated with it. To explore the cultural aspects of the population concerning obesity, health habits, eating behaviors, perceptions of obesity, its management, and the associated stigma were evaluated among a sample of the Brazilian population.

The primary objective was to uncover discrepancies between the public's perception of obesity and scientific evidence to provide information that could contribute to educational initiatives to reduce and prevent weight stigma and increase awareness. We hypothesized that there are significant discrepancies between public perceptions of obesity and scientific evidence, as well as an association between emotional eating behaviors and the presence of overweight and obesity.

Methods

The "Perceptions of Obesity" study was designed as a cross-sectional investigation to assess obesity perceptions, weight stigma, health habits, and emotional eating among Brazilian Internet users aged 18 years or older. A tailored questionnaire was developed by medical specialists in the field of obesity and administered by the research institute *Inteligência em Pesquisa e Consultoria Estratégica* (IPEC).

A representative sampling technique was employed to ensure the inclusion of individuals from diverse ABC socioeconomic classes: class A (higher-income), class B (middle-income), and class C (lower-middle-income), with a proportional distribution across Brazil's five geographic regions: north (109 interviews), northeast (341), southeast (996), south (370), and central-west (184). Participants were selected via online panels, where they provided demographic information that qualified them to receive study invitations via email, and completed the surveys through the provided links.

To address potential selection bias, the study applied the Random Iterative Method (RIM), ensuring that the final sample profile accurately reflected the target population. Access to the questionnaire was controlled for key variables such as age, sex, geographic region, household income, municipality status (capital or non-capital cities), and, where applicable, obesity class. A sample size of 2650 was defined based on IPEC's internal guidelines, ensuring a sufficient number of interviews for detailed analysis while considering an acceptable sampling error for the total sample, with a 95% confidence level and a 4% margin of error.

An initial screening question on self-reported weight and height was employed to ensure the proper classification of participants by body mass index (BMI). BMI was categorized as follows: Underweight: BMI < 18.5 kg/m²; Eutrophy[1]: BMI 18.5 to 24.9 kg/m²; Overweight: BMI 25 to 29.9 kg/m²; Class I Obesity: BMI 30 to 34.9 kg/m²; Class II Obesity: BMI 35 to 39.9 kg/m²; Class III Obesity: BMI ≥ 40 kg/m² [18]. Self-reported measurements of weight and height have previously been investigated in the Brazilian population and validated as possible alternatives for determining weight status [19].

The questionnaire was developed by a medical specialist in the field of obesity and includes items adapted to Brazilian cultural standards from various validated instruments (see supplementary material) [4, 20]. These items explored topics related to obesity stigma and the role of healthcare professionals in managing obesity, lifestyle changes, and eating behaviors. Dietary habits were assessed using an adapted version of the Food Frequency Questionnaire [21], and eating behaviors were evaluated using a Three-Factor Eating Questionnaire [22].

Descriptive statistical analysis was conducted utilizing Stata/BE 18.5 (StataCorp LLC, College Station, TX, USA). Survey results were reported as percentages to elucidate the most frequently selected responses and the degree of concordance with specific statements. Differences between groups were evaluated using chi-squared tests (χ^2), with statistical significance established at $p < 0.05$ (two-tailed test). Given the exploratory and descriptive nature of this study, no adjustments were made for multiple comparisons.

[1] We adopted the term'eutrophy' rather than'normal weight' when describing individuals whose BMI fell within the reference range. This decision was made to avoid suggesting that other body sizes are abnormal or undesirable. Our choice reflected a commitment to using a neutral, non-stigmatizing language when addressing topics related to obesity and health.

In accordance with Resolution No. 510/2016 of the Brazilian National Health Council, this public opinion research involving unidentified participants was exempt from review by the research ethics committee. All procedures adhered to the ethical standards established by the Brazilian Association of Research Companies (ABEP), and complied with the international quality standards ISO 20.252 and ISO 9001.

Results

The study involved 2560 individuals ≥ 18 years old from social classes A to C. Participants' ages ranged widely, with the most common age groups being 45 to 59 years (26%), 35 to 44 years (23%), and 25 to 34 years (23%). Gender distribution showed that 52% of the participants were female, 47% were male, and 1% identified as nonbinary/transgender. The BMI distribution among the participants was as follows: 4% obesity class III, 6% obesity class II, 16% obesity class I, 34% overweight, 37% eutrophy range according to BMI, and 3% underweight. 65% of the participants were from socioeconomic class C (low income). The educational levels of the participants varied, with 50% having completed high school and 43% having higher education. Table 1 provides a comprehensive overview of the study population's social demographics.

Participants were first asked about the most important actions to ensure their health (see supplementary Table 1): maintaining a balanced diet (44%), engaging in exercise (22%), and undergoing regular medical checkups (17%) were the most cited. Adequate sleep (6%) and smoking avoidance (5%) were also identified as significant factors, but they had a lower degree of relevance. However, maintaining a healthy weight and limiting alcohol consumption were prioritized less, with only a small percentage mentioning them (< 5%).

Table 1 Demographic and socioeconomic characteristics of the participants

Age group	
18–24	16%
25–34	23%
35–44	23%
45–59	26%
≥ 60	12%
Gender	
Female	52%
Male	47%
Nonbinary/transgender	1%
BMI category	
Obesity class III	4%
Obesity class II	6%
Obesity class I	16%
Overweight	34%
Eutrophy	37%
Underweight	3%
Socioeconomic class	
A/B (high/medium income)	35%
C (low income)	65%
Education level	
Elementary education	6%
High school	50%
Higher education	43%

This study showed that although people understand the importance of a balanced diet and regular exercise, they face environmental obstacles that affect their food and lifestyle choices. Findings revealed that a substantial proportion of participants (69%) frequently choose "unhealthy" food options when experiencing an urge. This behavior was more common among individuals with obesity (74%), followed by those with overweight (66%) and eutrophy or underweight (67%), with a statistically significant difference among the three groups ($p = 0.003$). Moreover, approximately one-third of the participants do not consume adequate amounts of fruits and vegetables, and a considerable number prefer restaurants or delivery meals, as indicated by 31% of the respondents.

Furthermore, 45% of the participants reported being physically active, with 48% of those in the eutrophy or underweight category, 50% of those in the overweight range, and 36% of those with obesity engaging in regular physical activity. This difference was statistically significant among the three groups ($p < 0.001$). Figure 1 elucidates the participants' habits.

Another stage of the survey aimed to gather participants' insights on the intricacy and implications of obesity (Table 2). Among the entire sample, 76% either totally or partially considered obesity, such as diabetes and hypertension, a disease. In contrast, a significant 37% of participants believed that obesity is a psychiatric disorder, and more than one-quarter of the respondents perceived individuals with obesity as culpable for their weight status.

To address the adoption of the person-first language, participants were asked to suggest the most appropriate term to refer to someone with obesity (see supplementary Table 2). In considering participants with obesity and overweight status, respectively, 38% and 37% preferred the term "people with obesity," and 24% and 29% chose "obesity sufferer/carrier"; finally, 18% and 15% indicated that the term "obese person" would be the best fit.

When questioning medical care and comorbidities (see supplementary Table 3), 61% of individuals with BMI ≥ 30 kg/m² reported that they had never been diagnosed with obesity. The relationship between obesity and various health conditions was further substantiated, with higher self-reported rates of hypertension (30%), diabetes/prediabetes (21%), and liver disease (14%) among those with obesity. Although these diseases were associated with excess adiposity, a substantial number of the

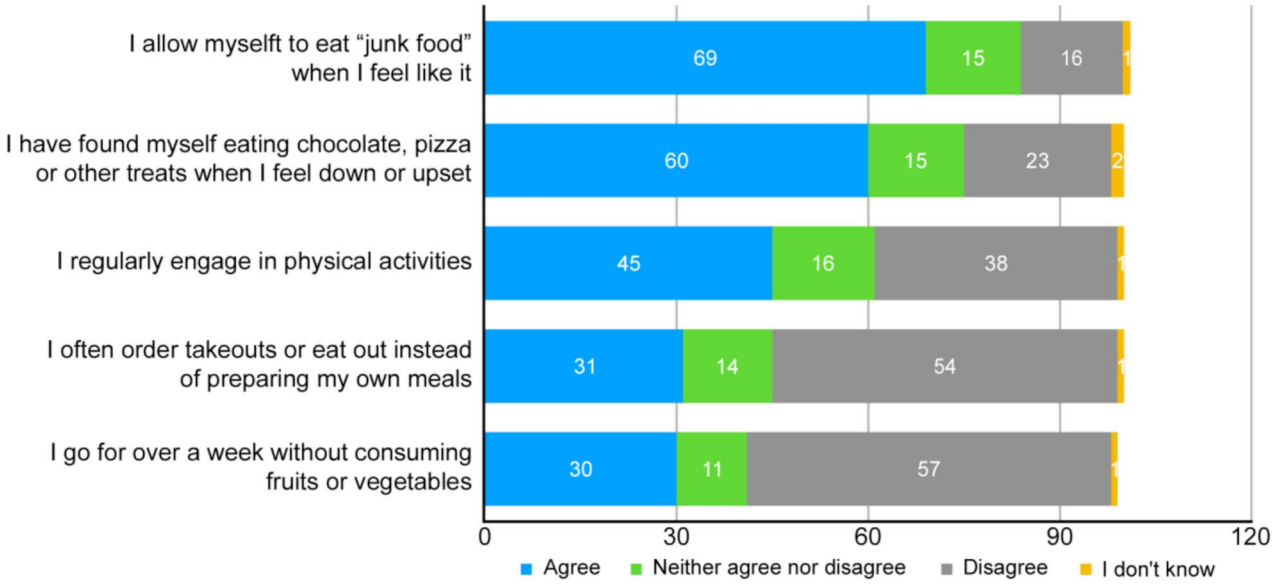

Fig. 1 Responses indicating agreement or disagreement with the statements regarding daily health habits

Table 2 Participant responses: "In everyday life, people express their thoughts on specific topics. Regarding obesity, indicate whether you agree or disagree with the following statements:" the percentages shown indicate agreement with the statements

	Eutrophy/underweight	Overweight	Obesity	Total	*p* value
To lose weight, it is enough to exercise and eat a healthy diet.	62%	68%	67%	65%	0.016
Losing weight requires a change in habits and sometimes treatment with medication as well.	79%	83%	84%	82%	0.013
The best way to treat obesity is by combining lifestyle changes with medication.	51%	56%	57%	54%	0.017
I know someone, or I have used weight loss medication without medical supervision.	45%	53%	60%	52%	< 0.001
It is difficult for someone overweight to lose weight without the support of medication for obesity treatment.	33%	39%	38%	37%	0.018
Nowadays, it is possible to address obesity without medical supervision; there is a lot of information on the Internet.	29%	29%	36%	31%	0.007
Simply taking medication is enough to lose weight.	8%	8%	9%	8%	0.677
People with obesity are responsible for being overweight.	27%	27%	27%	27%	0.994
Obesity is a disease, just like diabetes and hypertension.	75%	76%	79%	76%	0.189
Obesity is considered a psychiatric disease.	34%	38%	39%	37%	0.051

participants (26%) with obesity reported no diagnosis of associated conditions.

In treating obesity, only a small fraction of the participants believed that modest weight loss was sufficient to improve health conditions associated with obesity, such as hypertension and diabetes (see supplementary Table 4). Specifically, only 1% believed that losing 5% of body weight would lead to significant health benefits for individuals with obesity. Meanwhile, 6% of the overall participants (only 5% of those actually with obesity) thought that losing 10% of body weight was sufficient for substantial improvements in comorbidities. Conversely, ~66% of all participants and 69% of those with obesity held the view that attaining a BMI within the eutrophy range is essential for reducing obesity-related complications, such as stroke and myocardial infarction.

Participants were asked to share their views on the best treatments for obesity, including opinions on diet, exercise, and the use of antiobesity medications. Table 2 indicates that a significant percentage of the respondents, 65% of the total sample and 67% of those with obesity, believed that diet and exercise are sufficient for managing obesity, with differences observed according to BMI ($p = 0.016$). However, the proportion of individuals who considered a combination of lifestyle changes and antiobesity medications to be the best option for obesity treatment decreased to 54% and 57%, respectively ($p = 0.017$).

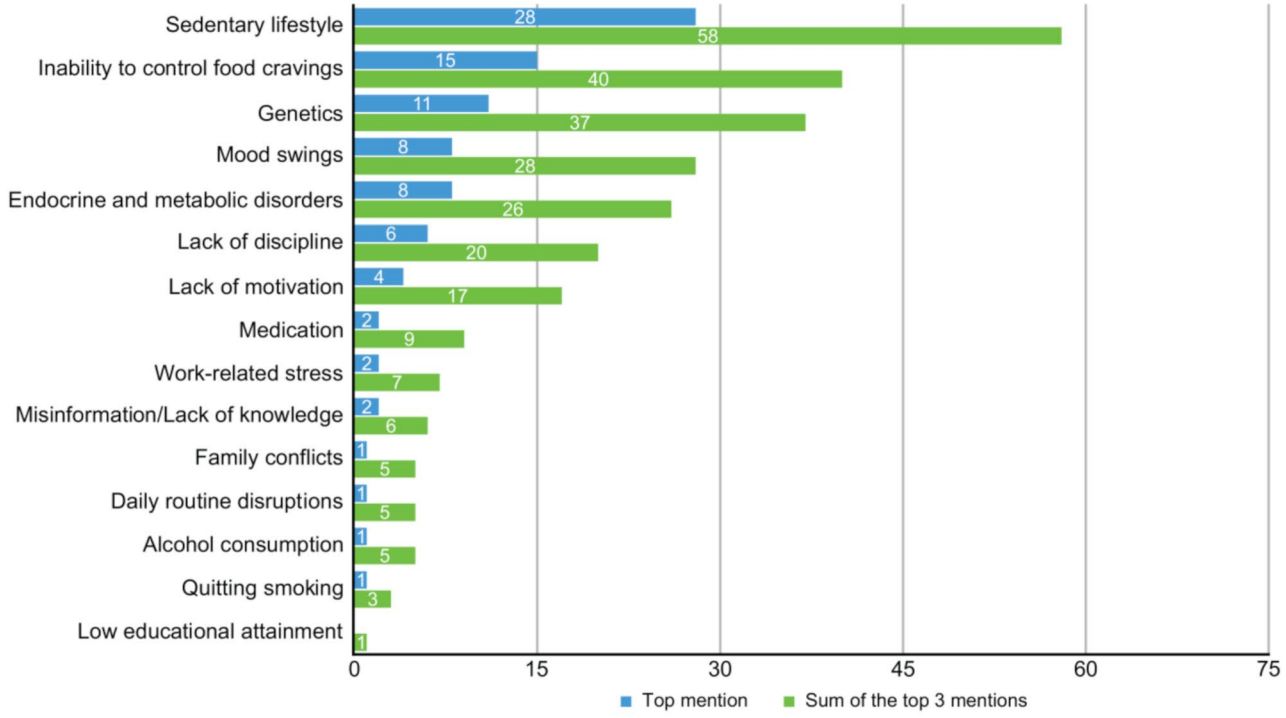

Fig. 2 Participant responses: Main cause of obesity (first, second, and third places)

Table 3 Participant responses: "regarding your eating habits, which of the following situations resonate with you?"

	Eutrophy/underweight	Overweight	Obesity	Total	*p* value
I am always snacking between meals.	26%	26%	28%	27%	0.456
I often experience an uncontrollable craving for a specific type of food (sweets or snacks).	20%	24%	33%	24%	< 0.001
I have a few meals, all with large quantities of food.	21%	18%	25%	21%	0.001
My first meal of the day is lunch.	17%	18%	21%	18%	0.039
I eat to relieve stress or negative feelings.	9%	13%	25%	15%	< 0.001
I eat to celebrate or reward myself.	11%	14%	21%	14%	< 0.001
I have most of my meals after 6 PM.	6%	9%	9%	8%	0.01
I wake up in the middle of the night and cannot go back to sleep until I eat.	2%	2%	4%	3%	0.035

Furthermore, a significant proportion of individuals with obesity, which accounts for ~36%, believed that they could effectively manage their condition without any medical guidance, opting for self-help resources, such as the Internet. 60% of these individuals revealed that they or someone they knew had previously used anti-obesity medication without the supervision of a medical professional.

According to the survey, in relation to the primary cause of obesity (Fig. 2), sedentarism was pinpointed as a contributing factor in 28% of the responses. 15% of the participants attributed the condition to a lack of self-control concerning food cravings. Genetic factors were noted as the cause for 11% of the respondents. Endocrine and metabolic factors were recognized by 8% of the participants as playing a role in obesity. Furthermore, 6% of the respondents mentioned lack of self-discipline as a significant factor. Less than 5% of the responses highlighted other factors contributing to obesity, such as medication use and stress.

Regarding eating habits, 15% of the respondents reported eating to cope with stress or negative emotions (Table 3). This behavior was prevalent across different body weight categories: 55% of individuals with eutrophy or underweight status, 59% of those with overweight status, and 67% of those with obesity reported having, at some point, consumed chocolate, pizza, or other treats during moments of distress or sadness (Fig. 1). The variation in prevalence among these three groups was found to be statistically significant ($p < 0.001$).

Among individuals with obesity (Table 3), 28% exhibited picking and nibbling behavior, compared to 26% of

Table 4 Participant responses: "considering emotional hunger, which is felt at moments of sadness, stress, etc., how would you describe it?"

	Eutrophy/underweight	Overweight	Obesity	Total	*p* value
Has felt it and can recognize it right away as emotional hunger	37%	32%	31%	34%	0.026
Has felt it but only realized it after eating	13%	14%	21%	15%	< 0.001
Has felt this but did not know it was emotional hunger	13%	13%	12%	13%	0.585
Has felt it but, even knowing it, could not control	5%	8%	14%	9%	< 0.001
Never felt emotional hunger	33%	32%	22%	30%	< 0.001

those with overweight and 26% of those with eutrophy or underweight status, with no significant difference among the three groups ($p = 0.456$). In contrast, 33% of individuals with obesity, 24% of those with overweight, and 20% of those with eutrophy or underweight status reported experiencing an uncontrollable craving for specific foods, with a statistically significant difference among the groups ($p < 0.001$). Furthermore, a significant difference ($p < 0.001$) was observed among the three weight groups in using food as a coping strategy for stress or negative emotions. This behavior was reported by 25% of individuals with obesity, 13% of those classified as overweight, and 9% of those categorized as eutrophic or underweight.

In terms of eating patterns, a statistically significant difference ($p = 0.01$) was observed among three weight groups regarding consumption of larger food portions after 6 PM. This behavior was reported by 9% of individuals with obesity, 9% of individuals with overweight, and 6% of those classified as eutrophic or underweight. Additionally, there was a significant difference ($p = 0.035$) among the groups concerning nocturnal eating habits. Specifically, 4% of individuals with obesity, 2% of those with overweight, and 2% of those with eutrophy or underweight status reported waking up during the night and being unable to resume sleep without eating.

These findings indicate that while behaviors such as emotional eating and nighttime eating are statistically more prevalent among individuals with obesity, the differences are not substantial across weight categories.

Furthermore, 78% of individuals with obesity, 68% of those with overweight, and 67% of those with eutrophy or underweight status reported experiencing emotional hunger at some point in their lives, with a statistically significant difference among the three groups ($p < 0.001$). The ability to recognize emotional hunger as it occurs varied significantly among the groups ($p = 0.026$), with 37% of individuals with eutrophy or underweight status, 32% of those with overweight, and 31% of those with obesity demonstrating this awareness. Additionally, a statistically significant difference was observed in the proportion of individuals who acknowledged their emotional hunger during eating but were unable to control it ($p < 0.001$): 14% of those with obesity, 8% of those with overweight, and 5% of those with eutrophy or underweight status (Table 4).

Discussion

This study revealed a trend toward a greater prevalence of grades II and III obesity in 10% of the participants in Brazil, which differed from the previously reported 5.7% [23]. This suggested a potential increase in the number of severe obesity cases in the Brazilian population. However, this should be taken cautiously because this study was not performed to estimate the prevalence of obesity, potential selection bias exists, and all information was self-reported. Nonetheless, self-reported surveys generally underestimated obesity prevalence [24, 25].

When inquiring about foundational health practices to support well-being, a balanced diet and regular exercise were commonly highlighted by participants as essential. However, this study revealed variations in the application of these habits; a lower proportion of the participants with obesity (36%) reported engaging in regular physical activity than those within the eutrophy (48%) and overweight (50%) ranges (($p < 0.001$). Although barriers to exercise among patients with obesity have not been addressed, previous evidence in the literature indicated that weight stigma is a trigger for avoidance and decreased motivation for exercise in patients with obesity [26]. Furthermore, an analysis of all participants' dietary habits revealed a pattern of selecting less nutritious food options during moments of craving, a behavior evident in individuals from all BMI categories, but was more common among individuals with obesity.

In the Brazilian sample, 60% of the participants reported consuming chocolate, pizza, or other "treats" when feeling sad or down. This trend was also observed in other populations. Talbot et al. [27] and Skolmowska et al. [28] corroborated this notion by emphasizing that emotional eating is prevalent across various weight categories and can be triggered by negative emotions. Among the 24,968 participants in a study conducted in Norway in April 2020, after 6 weeks of interventions to address the initial wave of the coronavirus disease pandemic, where 50% were < 50 years old and 56% were female, with a mean BMI of 25 kg/m² (interquartile range: 23–28), 54% reported engaging in emotional eating, with women showing a higher tendency. A notable correlation was observed between psychological distress and emotional eating, with an odds ratio of 4.2 [29].

In another study in Turkey involving 1626 adults, with a mean BMI of 24.4 ± 4.7 kg/m² and 11.6% with obesity, 75.7% of the participants exhibited emotional eating tendencies to various extents. Specifically, individuals with obesity were more inclined toward emotional eating (43.5%) than those with eutrophy (33.5%) and underweight status (18.4%) [30].

In our study, 55% of participants with eutrophy/underweight status, 59% of those with overweight status, and 67% of those with obesity consumed foods such as chocolate, pizza, or other 'treats' when experiencing emotionally uncomfortable situations ($p < 0.001$). Additionally, 25% of participants with obesity and 9% of those with eutrophy or underweight status reported eating to relieve stress or negative emotions ($p < 0.001$). These findings support that emotional eating is more common among individuals with obesity than among those with a eutrophy BMI.

This finding was supported by Bourdier et al. [31], who noted that individuals with obesity are more likely to choose hyperpalatable foods in emotional eating scenarios. This preference may contribute to weight gain and obesity, as suggested by Van Bloemendaal et al. [32], who found that people who engage in emotional eating exhibit modified brain reactions to food cues and are less responsive to the central effects of glucagon-like peptide-1 receptor stimulation. However, emotional eating was also present in individuals with eutrophy, highlighting that it is just one of several factors that could lead to weight gain and obesity. Although this observation did not establish a causal relationship, experiencing or internalizing weight stigma can adversely affect eating behaviors in individuals with overweight status and obesity [16]. Importantly, this self-recorded questionnaire may have highlighted internalized stigma, in which individuals with weight issues may believe that they cope badly with emotions.

Although HCPs agree that obesity is a disease [33], they rarely diagnose it in their offices. In this study, > 60% of individuals with obesity reported never having received a formal diagnosis. This lack of diagnosis may be related to the stigma associated with obesity in healthcare settings, as some studies suggested that individuals with obesity, especially those with a higher internalized weight stigma, avoid medical care [34]. Despite the importance of addressing obesity, studies found significant gaps in the documentation of obesity in medical records and hospital discharge summaries. Hossain et al. [35] discovered that only 1% of patients hospitalized with obesity or overweight status had their condition documented in their discharge summary, and only 13.2% of the medical records addressed the patient's weight status. Okorodudu et al. [36] noted that although BMI was recorded in electronic health records, 99% of the subjects did not receive a formal diagnosis of obesity.

The stigma surrounding obesity may contribute to delayed diagnoses. Research indicated that biases and stigma related to weight can affect the quality of care and outcomes for individuals with obesity, potentially leading to higher illness or death rates regardless of their weight or BMI [37]. This finding was supported by a study conducted by Hernandez-Boussard et al. [38], which found that individuals with obesity were less likely to receive cancer screening exams, guidance on smoking, and injury prevention. Many HCPs may hold biases toward patients with obesity, resulting in the overlooking of medical problems unrelated to weight. Consequently, these individuals often face scenarios in which their non-weight-related health issues are ignored or overemphasized based on their BMI [11].

One encouraging aspect is that > 70% of the participants identified obesity as a disease, reflecting the enhanced social recognition of obesity as a health issue. However, this recognition is overshadowed by the stigma linking obesity to psychiatric disorders, a belief held by approximately one-third of those interviewed. In terms of the causes of obesity, participants primarily identified lifestyle and behavioral factors as the main culprits, such as a sedentary lifestyle and loss of appetite control. Despite the available scientific evidence [1, 39], a small proportion of the participants acknowledged a genetic component in the development of obesity, and a few attributed it to a lack of self-discipline, highlighting the continued presence of social stigma surrounding the condition. The stigma associated with misinformation extends to HCPs. The ACTION-IO study demonstrated that only 44% of HCPs agreed that genetics is a barrier to obesity treatment [33].

Based on this study, a substantial portion of individuals living with obesity or overweight status often have expectations not grounded in science when it comes to treatment, aiming to achieve a BMI that is deemed "normal". This expectation is evident when only 1% of the participants believed that losing 5% of their body weight would significantly improve their health, whereas more than two-thirds of individuals with overweight status or obesity believed that they need to reach a BMI range that is considered "normal." According to medical guidelines, weight reduction between 5% and 15% of the initial weight is sufficient to control obesity-related conditions [40, 41]. In 2022, the Brazilian Association for the Study of Obesity and Metabolic Syndrome (ABESO) published a document that categorizes obesity treatment based on weight loss by introducing the concepts of "controlled" and "reduced" obesity, proposing weight reduction values between 5% and 15%, according to the initial BMI [42]. This document is an evaluative tool

rather than a guideline [43], aiming to assess the clinical response to obesity treatment based on the maximum weight attained in life; however, this information is rarely asked. It is intended to facilitate personalized discussions between HCPs and patients about treatment strategies and is adaptable based on individual circumstances and the percentage of weight lost. This approach allows tailoring treatment plans to individual needs rather than imposing a one-size-fits-all solution. This disparity between evidence-based clinical guidelines and patient expectations underscores the need for a comprehensive educational approach to help patients understand obesity care.

Although scientific advancements have demonstrated the efficacy of treatments for obesity and the management of obesity-related comorbidities, 65% of the participants believed that only lifestyle modifications are necessary to tackle obesity. Previous evidence showed that lifestyle interventions have a limited impact on obesity management [5, 44]. 54% of the participants, including those with obesity, recognized the importance of incorporating pharmacological treatments in managing the condition. To combat the stigma associated with the pharmacological treatment of obesity, the ABESO and the Brazilian Society of Endocrinology and Metabolism recommended changing terminology [45]. Instead of using "weight loss drugs," which suggests that such medications are for anyone looking to lose weight and are only useful during the active phase of weight loss, they suggest terms like "medications to treat obesity" or "antiobesity drugs." These alternatives focus on treating the condition rather than solely on its symptoms, ensuring that the therapeutic approach is properly framed.

However, this perspective coexists with data showing that ~40% of individuals with obesity believed that treatment could be done without medical supervision, relying, for instance, on the Internet. This highlights the propensity of patients with obesity to view weight as their responsibility. For instance, in the ACTION-IO study, 81% of the participants claimed that their condition was their sole responsibility [33]. Although 68% of the patients preferred their HCP to initiate a conversation about their weight, it took 6 years for the initial conversation to occur. 71% of HCPs believed their patients were uninterested in losing weight, whereas only 7% shared this thought.

The significance of this situation was highlighted by the fact that 60% of the participants with obesity had either personal experience or were aware of individuals who had used over-the-counter antiobesity medications without medical prescriptions. Between 2004 and 2013 in the United States, an estimated 23,000 emergency department visits each year were linked to adverse events related to dietary supplements, mainly due to weight loss among young people, with the primary complaint being cardiovascular manifestations [46]. Along with the issue of self-medication, the scarcity of HCPs trained to manage obesity, combined with the problem of dispensing medications, such as orlistat, liraglutide, and semaglutide, without a prescription in Brazil, may contribute to the continuation of this alarming trend [14, 45].

There is a lack of published research and data on how common self-medication with drugs for obesity is among different groups of people in different countries. Two studies investigated self-medication for weight loss. A study in Mexico found that 42.9% of the participants used herbal products for weight loss bought without medical prescriptions [47]. Women, those with less education, and those in the middle socioeconomic class were more likely to self-medicate. Another study in Iran found that 12.87% of women with overweight status or obesity engaged in self-medication for weight loss, with younger women showing a higher tendency [48]. These results highlighted the worrying trend of individuals with obesity self-treating their condition, suggesting a pressing need for interventions to regulate this behavior effectively. This is particularly important in Brazil, where these rates are particularly high. Self-medication could also be a result of health professional stigma because individuals with obesity, fearing to be judged, may opt to avoid medical consultation [12, 45, 46].

To combat the stigma associated with obesity, the use of people-first language has been recommended in recent years [49, 50]. This study showed that most individuals agreed that the most appropriate term is "people with obesity." This finding validated the preferred term to be used in Brazilian Portuguese to reduce stigma.

This study has some limitations. Although we aimed to include a diverse sample of Brazilian Internet users from different socioeconomic backgrounds, the sample may not fully capture all perspectives, particularly due to potential selection bias introduced by online recruitment and varying levels of Internet access across Brazil. Another limitation is the reliance on self-reported data for variables such as weight, height, and medical diagnoses, which may introduce measurement bias. Additionally, diagnosing emotional eating through a self-administered questionnaire presents limitations, as the approach used was generic, allowing participants to simply agree or disagree with the statements presented.

Furthermore, most of the questionnaire was specifically designed for this study and has not been validated in other settings, which is particularly relevant for questions related to emotional eating. However, our intention was not to diagnose eating disorders, as this would require a more comprehensive assessment tool. Given that attention in online surveys tends to decline with longer

durations, our goal was to capture general perceptions rather than conduct a clinical evaluation.

Despite these limitations, to the best of the authors' knowledge, this is the first study in Brazil to explore perceptions of obesity, its treatment, and stigma in a representative sample of the population.

Conclusions

In this study, diet and physical activity were regarded as the most critical factors for achieving better health, with a widely held belief that normalizing BMI is crucial for improving health. Despite this emphasis, a substantial number of individuals with obesity remain undiagnosed, and there is a widespread misconception that diet and exercise are the only factors to consider. Emotional eating is a prevalent behavior observed across all BMI categories but is more common among individuals with obesity. However, it remains unclear whether emotional eating is a contributing factor or a result of obesity, which adds to the complexity of understanding and addressing this issue.

Therefore, obesity management is complicated by multifaceted challenges, which include a lack of understanding of its causes, misaligned expectations regarding treatment outcomes, stigma associated with seeking treatment, and skepticism toward HCPs who may not openly address the issue through diagnosis and also face credibility challenges when prescribing medication treatments. These factors significantly increase the complexity of effective management of obesity. Addressing these multifaceted challenges of obesity requires a comprehensive strategy that includes dispelling myths through education, providing empathetic support to combat stigma, and implementing personalized treatment plans that consider the complexity of the factors contributing to the causes and phenotypes of obesity.

Supplementary Information

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Supplementary Material 1

Supplementary Material 2

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Author contributions
LFV, FM, CMV and BH conceived the study design. IPEC carried out the study. LFV, FM and MAB analyzed data. All authors were involved in writing the paper and had final approval of the submitted and published versions.

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Data availability: The datasets used and/or analyzed during the current study are available from the corresponding author upon reasonable request.

Data availability
No datasets were generated or analysed during the current study.

Declarations

Ethics approval and consent to participate
This public opinion research was conducted in accordance with applicable national guidelines, and therefore, formal ethical approval was not required, as the participants were non-identified and the information collected did not allow for individual identification. All participants were informed about the purpose of the study and consented to participate voluntarily.

Consent to publication
Informed consent was obtained.

Competing interest
LFV reports payment or honoraria from Novo Nordisk and AstraZeneca; travel/meeting support from Novo Nordisk and Eli Lilly and Company. FM reports have been employed by Merck KGaA. CMV reports payment or honoraria from Eli Lilly and Company, Novo Nordisk, Merck S.A., PTC, Chiesi and Boehringer-Ingelheim; travel/meeting support from Novo Nordisk, Eli Lilly and Boheringer-Ingelheim; participation on Advisory Board for Eli Lilly, Novo Nordisk and Chiesi; receipt of equipment, materials, drugs, medical writing, gifts or other services from Chiesi-Amryt; and is a Member of the Board of Directors of the Brazilian Association of Obesity. MAB reports being employed by Merck KGaA. BH reports payment or honoraria from Eli Lilly and Company, Novo Nordisk, Merck S.A., AstraZeneca and Abbott Nutrition; travel/meeting support from Novo Nordisk; participation on a Data Safety Monitoring Board or Advisory Board for Eli Lilly, Novo Nordisk and Merck S.A; receipt of equipment, materials, drugs, medical writing, gifts or other services from Eli Lilly and Company and Novo Nordisk; and is President of the Brazilian Association of Obesity and a Member of Board of Trustees of World Obesity Federation representing Latin America.

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