Psychology of Health

Extension of Brazilian Silhouette Scale for the Context of Super Obesity

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Abstract: Body image assessment in the pre- and postoperative periods of bariatric surgery is essential to identify weight loss expectations and potential disorders associated with mental health outcomes. Silhouette scales are widely used to measure body dissatisfaction and body size estimation. This study aimed to expand the Brazilian Silhouette Scale for Adults to make it suitable for use in contexts of super obesity (BMI ≥ 50 kg/m2). The sample consisted of 61 adults (52 women and 9 men) with an average BMI of 48.55 kg/m² (*SD* = 7.64), all candidates for bariatric surgery. Validity and test-retest reliability procedures were conducted. Results showed moderate correlations (Pearson's r between .46 and .63; *p* < .05), indicating the scale's adequacy for this population. The new version includes figures representing BMIs up to 72.5 kg/m², enhancing the clinical and scientific assessment of body image in a more inclusive manner.

Keywords: body image, body dissatisfaction, statistical validity, bariatric surgery, morbid obesity

Extensão da Escala de Silhuetas Brasileiras para o Contexto de Superobesidade

Resumo: A avaliação da imagem corporal no pré e pós-operatório da cirurgia bariátrica é fundamental para identificar expectativas relacionadas à perda de peso e possíveis distúrbios associados à saúde mental. As escalas de silhuetas são amplamente utilizadas para mensurar insatisfação corporal e estimação do tamanho corporal. Este estudo teve como objetivo ampliar a Escala Brasileira de Figuras de Silhuetas para Adultos, adequando-a a contextos de superobesidade (IMC ≥ 50 kg/m2). A amostra foi composta por 61 adultos (52 mulheres e 9 homens) com IMC médio de 48,55 kg/m² (*DP* = 7,64), candidatos à cirurgia bariátrica. Foram conduzidos procedimentos de validade e fidedignidade teste-reteste. Os resultados demonstraram correlações moderadas (r de Pearson entre ,46 e ,63; *p* < ,05), indicando a adequação da escala para essa população. A nova versão inclui figuras representando IMCs de até 72,5 kg/m², ampliando a capacidade de avaliação clínica e científica da imagem corporal de forma mais inclusiva.

Palavras-chave: imagem corporal, insatisfação corporal, validade estatística, cirurgia bariátrica, obesidade mórbida

Ampliación de la Escala Brasileña de Silueta para el Contexto de la Superobesidad

Resumen: La evaluación de la imagen corporal en los períodos pre y postoperatorio de la cirugía bariátrica es fundamental para identificar expectativas relacionadas con la pérdida de peso y posibles trastornos asociados a la salud mental. Las escalas de siluetas se utilizan ampliamente para medir la insatisfacción corporal y la estimación del tamaño corporal. Este estudio tuvo como objetivo ampliar la Escala Brasileña de Figuras de Siluetas para Adultos, adecuándola a contextos de superobesidad (IMC ≥ 50 kg/m2). La muestra estuvo compuesta por 61 adultos (52 mujeres y 9 hombres) con un IMC promedio de 48,55 kg/m² (*DE* = 7,64), todos candidatos a cirugía bariátrica. Se llevaron a cabo procedimientos de validez y fiabilidad test-retest. Los resultados mostraron correlaciones moderadas (r de Pearson entre ,46 y ,63; *p* < ,05), indicando la adecuación de la escala para esta población. La nueva versión incluye figuras que representan IMC de hasta 72,5 kg/m², ampliando la evaluación clínica y científica de la imagen corporal de manera más inclusiva.

Palabras clave: imagen corporal, insatisfacción corporal, evalidación estadística, cirugía bariátrica, obesidad mórbida

Body image (BI) has been considered one of the most relevant psychosocial variables when it comes to obese people who are candidates for and undergo bariatric surgery, influencing decision-making regarding the procedure (Kapera et al., 2023) and satisfaction with the result (Bertoletti et al., 2019). The concept of BI is complex and multidimensional, integrating components related to physical appearance, such as the mental representation of one's own size, shape and facial features, as well as personal attitudes regarding one's own appearance, in which cognition, feelings and behaviors are implicated (Cash & Smolak, 2011). Body image is highly influenced by psychological, social, cultural, biological, historical, and individual factors (Cash & Smolak, 2011). Its dimensions include components related to physical appearance, such as the mental representation of one's own size, shape, and facial features (perceptual dimension), as well as components related to the individual's attitudes, feelings, thoughts, investments, and satisfaction with their physical appearance (attitudinal dimension). More recently, Pinhatti and DeCastro (2024) described an additional component related to experimental paradigms of direct and indirect attentional access to bodies, such as those employing eye-tracking techniques.

Assessing body image in the preoperative period of bariatric surgery allows the multidisciplinary team to assess possible distortions in the patient's perception of their body shape, as well as expectations regarding post-surgical outcomes. While some studies have observed that available obesity treatments substantially improve body dissatisfaction, positively impacting psychological well-being (Bertoletti et al., 2023), other studies have shown that patients who tend to idealize their new body shape after weight loss show signs of dissatisfaction with the results after the first 24 months of bariatric surgery (Gaudrat, 2019).

Patients who are candidates for bariatric surgery tend to have high expectations for weight loss after the procedure (Hult et al., 2020), in addition to expecting improvements in physical comorbidities and the psychosocial impacts associated with obesity (Cohn et al., 2019). With the sleeve surgical technique, the average weight loss is 29.5% (*SD* ±9.0%) and with the bypass, 31.9% (*SD* ±8.1%) of total weight after one year (van Rijswijk et al., 2021). Considering the complex and widespread nature of preoperative expectations, it is important to assess early whether these expectations are appropriate and can actually be achieved, according to well-established clinical criteria for post-surgical weight loss. Discussing these expectations with patients can be helpful to avoid feeling like a failure if they do not reach their ideal weight. It is important during the preparation and psychoeducation process for surgery to emphasize the gains they will experience in their health and functionality (Alleva et al., 2023).

Assessing body image in severely obese individuals presents some challenges related to the measures used, which are generally developed for populations of normal-weight college women to investigate eating disorders. A systematic review conducted by Castro et al. (2017) identified nine instruments used to assess body image in the surgical treatment of obesity and concluded that the instruments used

in research to date predominantly measure attitude and level of satisfaction with one's own body. Although the psychophysical aspects of body image perception are relevant in a context of rapid weight loss, of the nine instruments surveyed, only the silhouette scales assess this perceptual dimension. Therefore, the methodological aspects of assessing body image in bariatric patients must be considered, especially regarding the selection of appropriate instruments for this population (Castro et al., 2017).

Initially developed by Stunkard et al. (1983), body shape scales consist of a series of frontal images of the body ranging from thin to obese, and are the most commonly used measures to assess both satisfaction and body perception (Castro et al., 2017). Body dissatisfaction is measured by calculating the discrepancy between current body size (current BMI) and desired BMI, assessed by choosing the figure or silhouette that best represents this estimate for the individual. Body shape scales also allow for assessing the accuracy of an individual's body perception by calculating the difference between their actual body size, measured by BMI, and the body size they perceive as real in the figures (current BMI).

The main advantage of body shape scales is their ease of application and the ability to collect data collectively. However, when used in studies with bariatric surgery patients, individuals' BMIs can significantly exceed the maximum BMI estimated for the last figure on existing body shape scales. It is known that the obese population reaches 14% of the world's population, including adults and children (World Health Organization [WHO], 2022). In Brazil, obesity affects 28.1% of the Brazilian adult population (WHO, 2022). These numbers are projected to continue rising, with an estimated 24% of the global population being obese by 2035 (World Obesity Federation [WOF], 2024).

In Brazil, Kakeshita et al. (2009) developed the Brazilian Adult Silhouette Scale, an instrument composed of 15 silhouette cards for each sex. The average BMI ranges from 12.5 kg/m2 (first figure on the scale) to 47.5 kg/m2 (last figure) for both sexes, considering a constant interval of 2.5 BMI points between figures, and an average Brazilian height of 1.65 m for women and 1.72 m for men. The adult sample analyzed in this study consisted of 90 participants (18 to 60 years old) with an average BMI of 28.0 (Kakeshita et al., 2009). Evidence of the validity and reliability of the Brazilian Figure Scale has been verified in several studies, with samples of adolescents (Laus et al., 2013), and in a sample of adults from six Brazilian capitals participating in the Longitudinal Study of Adult Health – ELSA – Brazil (Griep et al., 2012), with satisfactory results regarding the scale's applicability. This same scale has also been adapted and validated for digital use, with the aim of developing online questionnaires to assess risk behaviors for eating disorders (Freire & Fisberg, 2017).

Given the above, the present study aimed to expand the Brazilian Figure Scale for Adults, adapting it to contexts of superobesity (BMI ≥ 50 kg/m2). This study is part of a longitudinal design project that aimed to evaluate sociodemographic and psychological factors associated with the results of bariatric surgery, being developed with patients who were candidates

for and underwent bariatric surgery through the Unified Health System, in a university hospital in the city of Porto Alegre, RS.

From the beginning of data collection, using the original Brazilian Body Shape Scale, we found that a significant proportion of patients had BMIs above 50 kg/m2, which led us to consider expanding the scale for use in this population. This initiative is expected to provide a suitable body image assessment tool in contexts of obesity and superobesity, as a measure that supports the psychological evaluation of patients undergoing bariatric surgery.

Method

The first stage of this study consisted of computer graphics expansion of the original silhouette scale created by a graphic design specialist, maintaining the proportions of the figures on the scale, which consists of 15 male and female silhouettes. The first original silhouettes were based on photos of adults and children with known BMIs, while this new expanded version was created using the last silhouette on the original scale, as shown in Figure 1. Ten male and female silhouettes were added, respecting the constant 2.5-point BMI interval between silhouettes, totaling 25 silhouettes, as shown in Figures 2 and 3.

Figure 1

Inclusion of the 10 new figures that were added (silhouettes 16 to 25) made using computer graphics for both sexes.

Figure 2

Brazilian Scale of Silhouette Figures for Adults (original version – 15 silhouettes) and figures that were added (silhouettes 16 to 25) for females.

Figure 3

Brazilian Scale of Silhouette Figures for Adults (original version – 15 silhouettes) and figures that were added (silhouettes 16 to 25) for males.

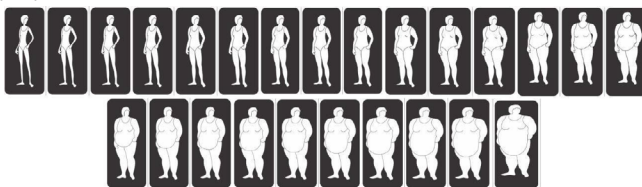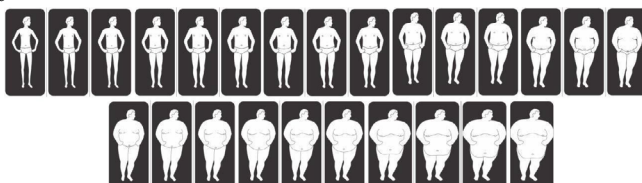The added silhouettes have corresponding BMIs ranging from 50 kg/m2 (silhouette 16) to 72.5 kg/m2 (silhouette 25) for both sexes. The new version of the scale was produced in the same way as the original scale, on individual laminated cards, 12.5 cm high by 6.5 cm wide, with the white silhouette centered on a black background measuring 10.5 cm high by 4.5 cm wide.

Participants

Individuals with severe obesity, patients of the Unified Health System (SUS), and candidates for bariatric surgery at a university hospital, who attend multidisciplinary bariatric surgery preparation groups. The sample size calculation for the study sought to monitor the distribution of the prevalence of underweight, normal weight, overweight, and obesity in the adult Brazilian population, according to data from the Ministry of Health (2023) through the Food and Nutrition Surveillance System. The sample recruitment was conducted after healthcare teams were informed in advance about the study and encouraged to invite patients who met the criteria to participate when they attended the multidisciplinary surgery preparation group monthly. Patients were informed about the study objectives and invited to participate by signing the Informed Consent Form (ICF).

Instruments

Questionnaire on sociodemographic and health conditions. The questionnaire was developed for use in this research and aims to obtain information about the participants, such as age, gender, education level, economic status, medical history, health problems (blood pressure, diabetes, sleep habits, cardiopulmonary function, etc.).

Anthropometric data. Each subject's weight was measured on scales available in the research rooms, without shoes, heavy objects or clothing. Height was measured using an anthropometer placed against a wall without baseboards, with the person leaning against the surface, standing upright, so that the eyes and ears traced parallel horizontal lines. Thus, the standards for measuring weight and height were followed to calculate BMI.

Brazilian Figure Scale for Adults (Expanded Version for Superobesity). This instrument was developed in this study to assess perception and dissatisfaction related to body image, including those with superobesity. The instrument consists of 48 cards (24 for each sex) with gradually increasing silhouette figures. The silhouettes cover the BMI range of 12.5 to 72.5 kg/m², and the proportion of BMI increase from one figure to the next is 2.5 kg/m².

Procedures

Reliability assessment procedures were conducted through test-retest, in the same manner as when constructing the original scale. Each participant's height, weight, and BMI were measured at both the test and retest. The tests were administered one to two months apart and were

always administered by trained research psychologists. Participants also completed a questionnaire to collect sociodemographic information.

Data collection. The new scale was displayed on the wall individually for each participant in ascending order. The scale for their own gender was presented first, and each person was asked to choose, in the following order: «the figure that best represents their current size,» «the figure that represents the size they would like to have,» and «the figure they consider to be the ideal size for their own gender in general.» The scale for the opposite gender was then presented, asking them to choose the «figure that best represents the ideal for that gender in general» (Kakeshita et al., 2009).

Data analysis. The data were tabulated and classified by gender. The actual BMI was calculated as the criterion, and the BMIs chosen in response to the researcher's questions were calculated. Statistical analysis consisted of frequency distribution and descriptive statistics of the data, according to gender and actual BMI in ascending order. Normality and distribution pattern analyses were conducted. A paired t-test was performed between the first and second measurements to analyze reliability, and Pearson's correlation was used for the values obtained at both scale administration times (Kakeshita et al., 2009). An independent t-test was used to compare estimated measures and body dissatisfaction between groups according to participants' age and education level. The analyses were performed using SPSS for Windows, version 20.0.

Ethical Considerations

The research project was submitted to and approved by the Research Ethics Committee (CEP) of the Hospital de Clínicas de Porto Alegre under opinion numbers 1.008.562 and 42178015.2.0000.5327. This study complies with CNS Resolutions 466/2012 and 510/2016, as well as other current regulations and legislation applicable to research involving human beings, in all phases of its implementation.

Results

The study included 89 patients in the test phase, and of these, 61 responded to the retest at the time of the second administration of the scale. The test and retest were spaced between one and two months apart. The sample was characterized by being predominantly female, consisting of 74 women and 15 men. Of these, 52 women and 9 men completed the retest, resulting in a sample loss of 28 participants (sample loss of 22 women and 6 men). Therefore, we chose to analyze the reliability procedures only with data from the general sample and the female sample, as the male sample did not reach the minimum sample size for the analyses.

Regarding sociodemographic data, 47.2% of the sample was married, with children (78.7%), and with an education level corresponding to incomplete elementary school (40.4%), complete high school (20.2%), and incomplete higher education (13.5%). Ages ranged from 25 to 68 years, with a mean of 45.8 years (SD = 9.9). The mean BMI of the sample at the time of the first administration was 48.55 kg/m2 (SD = 7.64), ranging from 36.21 to 74.47 kg/m2.

Table 1 presents the data related to the test-retest procedures of the new scale. We found positive and significant Pearson correlations between the two measures, with moderate values ranging from .46 to .63 in the sample. These results differ from the values obtained with the original scale, which presented moderate to high correlations (.60 to .93) in most assessments, with the exception of the correlations related to the silhouettes indicated by men as ideal, which were .53 and .54 (Kakeshita et al., 2009). The correlation found between actual and self-reported BMI also differed from the results of the original scale. While the correlation was high in the original scale (r = .81 for women and r = .84 for men), our study obtained a lower correlation of .59 for women and .50 for the total sample. It is worth noting that the original study's sample consisted of a non-clinical population (mean BMI of 28.0 for adults), while our study's sample consisted exclusively of clinical patients with severe obesity and superobesity.

Table 1

Mean in kg/m2 (SD) of the Real BMI and BMIs identified as Current, Desired, Ideal female and Ideal male, Estimation and Body Dissatisfaction, Pearson correlation coefficients and paired t-test in the assessment of test-retest reliability.

SAMPLE (*n*)	FEMININE (52)	TOTAL (61)
Actual BMI	48.21 (6.39)	48.24 (6.34)
Current BMI (figure)	51.97 (7)	51.43 (7.58)
Pearson Correlation	.59*	.50*
Current BMI (test)	51.97 (7)	51.43 (7.58)
Current BMI (retest)	51.73 (7.54)	51.31 (7.56)
Pearson's Correlation	.63*	.62*
Paired t-Test	n.s.	n.s.
Desired BMI (test)	30.24 (4.29)	30.08 (4.47)
Desired BMI (retest)	30.43 (4.58)	30.24 (4.64)
Pearson's Correlation	.67*	.63*
Paired t-Test	n.s.	n.s.
Ideal female BMI (test)	26.63 (4.25)	26.63 (4.18)
Ideal female BMI (retest)	27.11 (3.81)	26.88 (3.94)
Pearson's correlation	.54*	.50*
Paired t-test	n.s.	n.s.
Ideal male BMI (test)	24.85 (3.18)	25 (3.25)
Ideal male BMI (retest)	25.28 (4.39)	25.28 (4.21)
Pearson's correlation	.47*	.46*
Paired t-test	n.s.	n.s.
Body Estimation (test)	3.62 (6.20)	3,09 (9.48)
Body Estimation (retest)	3.53 (7.43)	3.13 (7.68)
Pearson Correlation	.60*	.62*
Paired t-test	n.s.	n.s.
Body Dissatisfaction (test)	-21,75 (7.88)	-21.38 (8.10)
Body Dissatisfaction (retest)	-21.34 (8.42)	-21.11 (8.30)
Pearson Correlation	.64*	.61*
Paired t-test	n.s.	n.s.

Note. * *p* < ,05

However, the paired t-test showed no significant difference between the measurements collected in the test and the retest, which indicates the temporal stability of the new scale.

Similar to the validation study of the Silhouette Scale in a sample of adolescents, conducted by Laus et al. (2013), we assessed the reliability of measures of accuracy of body estimation and body dissatisfaction, which showed moderate correlation indices, around 0.60 for both measures (Table 1). Scores close to zero indicate more accurate body estimation and less body dissatisfaction (Laus et al., 2013). In our sample, we observed a high level of body dissatisfaction, with an average of -21.75 kg/m2 (SD = 7.88) in the female sample, and a tendency to overestimate body size, with an average of 3.62 kg/m^2 (SD = 6.2) above the actual BMI. The correlation between these two measures was strong and inversely proportional (r = -.70), such that the lower the accuracy of body estimation, the higher the level of dissatisfaction. To explore the results from these two body image measures, we conducted an analysis between groups with lower (up to incomplete high school) and higher (from high school) education levels in the female sample. The data revealed that the group with higher education showed significant differences (p = .04) in body estimation accuracy compared to the group with lower education, with a moderate effect size: Cohen's d = 0.60 (95% CI 0.019–1.171). The group with higher education tended to overestimate their body size, presenting mean estimated values of 5.98 kg/m2 (SD = 6.3) above their actual BMI, which represents the selection of approximately two to three silhouettes larger than their actual size. Regarding body dissatisfaction, there were no significant differences between women with higher and lower levels of education. The analyses of body estimation and dissatisfaction associated with the participants' age did not show significant differences (Table 2).

Discussion

Our sample consisted of a greater number of female participants, which is consistent with the literature, which indicates that women are more likely to seek and complete bariatric surgery (Xie et al., 2024). Considering that the temporal stability of scores can vary depending on the nature of the construct assessed and the characteristics of the population (American Educational Research Association [AERA] et al., 2014), and that the validity parameters used as a reference in this study were originally established by Kakeshita et al. (2009) based on a non-clinical sample—composed of participants with an average BMI of 28 kg/m²—the results obtained in this research indicated satisfactory correlations between the measures at both assessment times, according to the criteria established by the Federal Council of Psychology (CFP, 2022). Although Thompson (2004) recommended a minimum correlation value of .70 for a body image assessment instrument to be considered reliable, it is important to evaluate the values found in light of the construct's temporal stability in a specific population such as our clinical sample, composed of people undergoing surgical weight loss treatment. Considering that body image refers to a multidimensional psychological experience, which includes thoughts, beliefs, feelings, and behaviors (Cash & Smolak, 2011), it is reasonable to consider that this construct may undergo variations in severely obese individuals during the process of preparation and psychoeducation for bariatric surgery. Thus, from a theoretical perspective, the reliability values found can be considered adequate.

Regarding the correlation between actual and perceived current BMI (r = .59 in the female sample), it is important to highlight that our study included participants exclusively from a clinical group: severely obese patients preparing for bariatric surgery, individuals who, due to their condition, often have greater difficulty estimating their own body size (Ferreira & Pereira, 2018). The participants in the development of the original scale, in turn, were representatives of the general population, divided into three different BMI classes (normal weight, overweight, and obese).

Our results are similar to those found in the study by Gardner et al. (1999), whose 13-figure scale showed correlation coefficients between perceived current body size and actual BMI of 0.58. The Body Image Assessment for Obesity (BIA-O) scale, developed for obese individuals and comprising a total of 18 figures, presented test-retest reliability

Table 2

Means and standard deviations of the values of Body Esteem and Body Dissatisfaction according to age and level of education in the female sample (n = 52)

Age range and education level	Body Consumption (kg/m²)	Sig (p)	Body Dissatisfaction (kg/m²)	Sig (p)
Age				
25 to 45 years (n = 28)	4.38 (6.10)	.42	-20.53 (7.59)	.10
46 to 68 years (n = 24)	3.01 (6.15)		-23.81 (6.94)	
Education				
Illiterate – Incomplete high school	2.46 (5.68)		-20.53 (7.59)	
(n = 33)		.04*		.12
Comp. high school -	5.98 (6.30)		-23.81 (6.94)	
Comp. high school (n = 19)				

Note. * p < .05

coefficients of .65 to .93, with a two-week interval between applications, in a sample of 77 participants (Williamson et al., 2000). Our results showed correlation coefficients of .63 for the current silhouette and .67 for the desired silhouette for the female sample, with a time interval ranging from one to two months. It is also important to highlight the fact that our expanded scale consists of 25 figures, a large number that can confuse the person being evaluated when choosing a silhouette.

In our study, the observed trend was toward overestimation of actual body size, with the selection of figures to represent their current body size averaging 3.76 kg/m2 higher than the actual BMI in the female sample. The findings from the construction of the original scale (Kakeshita et al., 2009) also showed an overestimation of body size among overweight and obese men and women. A similar trend was observed in the study by Laus et al. (2015) with Brazilian university students, in which women showed a greater tendency to overestimate their body size compared to the male group. This leads us to infer that women, regardless of their BMI, have difficulty estimating their body size.

The literature indicates that obese individuals who are candidates for bariatric surgery tend to experience body dissatisfaction (Ferreira & Pereira, 2018), which may improve after surgery (Bertoletti et al., 2023). Some studies show that obese people often misjudge their weight, either underestimating or overestimating their body size (Freigang et al., 2020). A recent meta-analysis (Freigang et al., 2020) found that study participants with a normal BMI are more likely than others to self-report their BMI accurately. However, it is important to consider the possibility that underestimation and overestimation of BMI may be less likely if a healthcare professional informs the patient about their obesity status, which is specifically the case for our group of participants, patients in a surgical obesity treatment program. Possibly, greater information about the risks of obesity on overall health makes people more self-conscious and cautious when assessing their own body size, leading to overestimation.

When analyzing the mean values of desired BMI, ideal female BMI, and ideal male BMI in the general sample, we observed that the numbers fall within the range of grade I obesity for desired BMI (30.08 kg/m2), which would be the goal after bariatric surgery, and overweight values for ideal female and male BMI (26.63 and 25 kg/m2). As in Gaudrat's (2019) study, the participants in our sample demonstrated awareness of the real possibilities for change in body size and shape after surgery, being realistic and cautious about their expectations. We can consider that this finding is a consequence of the pre-surgical preparation work of the institution's multidisciplinary team, which focuses on psychoeducation and lifestyle changes. Acceptance of body reality should be promoted and discussed alongside obesity treatment, thus preventing patients from creating the mistaken idea of a "magical" transformation after surgery (Alleva et al., 2023; Hult et al., 2020).

In a study on the construction and development of a silhouette scale exclusively for bariatric surgery (Ferreira & Pereira, 2017), the only one we are aware of in the literature, participants chose figures representing their current size that ranged from a BMI of 50 to 55.9 kg/m2, similar to our study, where we obtained an average of 51.43 kg/m2 for the current silhouette in the general sample. Regarding the desired silhouettes, participants chose figures corresponding to a BMI between 25 and 29.9 kg/m2, similar to our results. The ESCO – Silhouette Scale for Obesity Surgery – was developed by Portuguese researchers, and is composed of 11 female and male figures in black and white, distributed based on the BMI categories: underweight (<18.5 kg/m2), normal weight (from 18.5 to 24.9 kg/m2), pre-obesity (25 to 29.9 kg/m2), class I obesity (30 to 34.9 kg/m2), class II (35 to 39.9 kg/m2) and class III obesity (40 to 49.9 kg/m2), class IV obesity or superobesity (50 to 59.9 kg/m2) and class V obesity or supersuperobesity (≥60 kg/m2). To create the figures, the researchers worked with BMI ranges distributed among the eleven figures according to the criteria described above, unlike our study, where we worked with a constant interval of 2.5 kg/m2 between the figures, resulting in a greater number of figures on the scale.

Regarding the differences found between education levels, our results showed more accurate body weight estimation in women with lower levels of education, contradicting what some studies (Freigang et al., 2020) suggest is the opposite among obese women—that is, a greater tendency for body weight estimation errors among those with less education. In this regard, we found evidence in the literature that, in Latin America, media internalization of ideal and healthier body images is associated with higher educational levels among women, as well as higher rates of body dissatisfaction (Andres et al., 2024), suggesting that more educated women may be more susceptible to sociocultural ideals regarding the female body. Although our sample represents people from lower socioeconomic backgrounds, these results regarding body size perception were associated with different levels of education.

Although body image estimation and dissatisfaction do not have the same meaning (it is possible, for example, for a person to have an incorrect perception of their body size and still be satisfied with their body, and vice versa), our results showed a strong inverse correlation between these measures ($r = -.70$), which is consistent with the theoretical perspective on body image disorders and can be seen as evidence of the validity of the new scale.

Our study has some limitations, such as the small sample size. Furthermore, it was not possible to perform analyses of the male scale due to the low number of participants, which made it impossible to verify gender differences. It is worth noting that the 10 additional figures were created using computer graphics from the original silhouette scale, while the first original figures were based on photos of adults and children with known BMIs. The silhouette scale sought to follow the recommendations described by Gardner et al. (1999), such as the presentation of a greater number of figures, the omission of facial characteristics that could represent a specific ethnicity, and the possibility of measuring body estimation as an indicator of the degree of accuracy of the individual in relation to their size, in addition to the aforementioned procedures of validity and reliability of the scale.

Overall, the Brazilian Silhouette Scale, expanded for superobesity contexts, proved to be a valid instrument for assessing

body image, with adequate and satisfactory reliability results for the female population. Measures of body image satisfaction and dissatisfaction, as well as ideal silhouette measurements, allow the multidisciplinary healthcare team to assess weight loss expectations after bariatric surgery, working with patients on realistic goals. Considering that ideal silhouette models reflect relatively inflexible cultural standards, it is important to assess, with patients, their awareness that they may not achieve a very slim silhouette, even after significant weight loss.

This study presents results that indicate the applicability of the new scale, the first to include individuals with a BMI greater than 47.5 kg/m² in the Brazilian context. However, it is important to emphasize that the data analyzed predominantly refer to female participants, so the results obtained do not allow generalizations to the male population. Therefore, it is recommended that future studies expand the sample size, including more men, to provide additional validity evidence, refine the instrument, and enable its adaptation for digital use. The number of figures obtained may hinder the instrument's practical application, and it is important to evaluate in the future whether to reduce the number of figures, increasing the interval between them, or working based on BMI classes. Indeed, the ideal number of figures for figure scales remains a controversial topic, since while offering more alternatives, a large number of figures may not be advantageous at the time of application. It is hoped that the Brazilian Figure Scale, expanded for the context of superobesity, will become a useful instrument for assessing body image in clinical and hospital settings, especially for candidates for bariatric surgery. Finally, the fact that this type of scale involves perceptual aspects untainted by learning allows the scale to be used in longitudinal studies with assessments at different time points in patients undergoing bariatric surgery. This allows us to assess both the acuity of perception and satisfaction/dissatisfaction with body image, both before surgery and at different times during post-surgery follow-up.

Data Availability

The dataset supporting the results of this study is not publicly available.

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