

Body Self-Perception, Dietary Self-Efficacy, and Body Mass Index in Young Adults: A Cross-Sectional Survey

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Background: Body self-perception and dietary self-efficacy may represent an important factor in the prevention of excess body weight. **Purpose:** This study evaluated body self-perception, dietary self-efficacy, and body mass index (BMI) in the Peruvian population. **Methods:** A cross-sectional online survey was administered to 190 men and 210 women. Each participant was shown 9 Stunkard anatomical silhouettes corresponding to BMI values. The results obtained were classified as underweight, normal weight, overweight, and obese. The Dieting Self-Efficacy Scale (DIET-SE) was also applied. Chi-square statistic, Kruskal–Wallis, Student *t*-test, and ANOVA were used to explore differences in means and proportions. **Results:** Age was significantly higher in those who underestimated their weight and who were dissatisfied with their body ($p = 0.000$). BMI was higher in men, most were dissatisfied with their body ($p < 0.05$), and were more likely to underestimate their weight compared to women ($p = 0.000$). Those participants who were dissatisfied with their body and who underestimated their weight were more likely to have an elevated BMI compared to those who were satisfied and who did not underestimate their weight. All participants had low dietary self-efficacy (LDSE), with a little higher proportion in men compared to women (62.6% vs 61.4%). The majority (45.9%) reported little confidence to resist high-calorie food temptations. More than half of the participants reported body dissatisfaction and LDSE, this was more frequent in men compared to women. **Conclusion:** It is necessary to develop and implement preventive measures to improve self-perception of the body, taking into account factors such as gender, age, and eating habits. **Keywords:** dietary self-efficacy, BMI, body self-perception, obesity, Peru

Introduction

Overweight and obesity represent a challenge in terms of prevalence, incidence, and economic burden for countries' health systems.¹ In 2016, the World Health Organization estimated that 39% and 13% of persons over the age of 18 in the world were overweight and obese, respectively.² The prevalence of overweight and obesity has doubled since 1980 in more than one-third of the world's population.³ In Peru, according to data from the National Health Institute, the prevalence of overweight and obesity in people over 15 years of age was 37.8% and 22.3%, respectively,⁴ which makes the country one of the Latin American countries with the highest prevalence.

The etiology of obesity is multifactorial. The most important related causes are physiological factors characterized by changes in the amount and distribution of body fat;⁵ environmental factors, such as lack of physical activity,⁶ unhealthy eating habits,⁷ and lack of adequate nutritional knowledge about healthy eating.^{8,9} Excess body weight considerably increases the risk of morbidity and mortality from chronic diseases such as diabetes mellitus, cardiovascular disease, and hypertension.^{2,3} In addition, it is associated with decreased quality of life.¹⁰

A negative self-perception of the body could affect weight control and induce obesity.^{11,12} Often, people tend to underestimate current weight and overestimate height, which could impact risk factors and negative implications on health outcomes.¹³ Previous studies suggest that the actual weight is often not always acceptable for both overweight and normal-weight individuals.¹⁴ BMI and body self-perception are influenced by various factors such as physical, emotional, interpersonal, and cultural.^{15,16} In addition to these factors, there are sociocultural aspects, including the media that portray the “ideal body” as a tall and slender body, this, in the Peruvian context, does not reflect the physical constitution of many people, who have an erroneous perception of their own body.¹⁷ The media can increase the prevalence of body dissatisfaction and subsequently induce inappropriate eating habits.¹⁸

Dietary self-efficacy, defined as the perceived ability of an individual to make healthy food choices, even when faced with potential obstacles, is a relevant factor in the onset and prevention of overweight and obesity.¹⁹ Low dietary self-efficacy (LDSE) can trigger eating problems,²⁰ which can subsequently affect health.²¹ Therefore, it is important to identify the presence of LDSE before it becomes a health concern. LDSE may also be associated with sociocultural pressures, concerns about body weight, insecurity and body dissatisfaction.²² For example, the concern that the body build is too small or not muscular enough can lead to unhealthy eating behaviors to achieve increased muscle mass.²³

To date, there are no studies conducted in Peru on body self-perception, BMI, and dietary self-efficacy.²⁴ In order to achieve a satisfactory control of body weight, reduce the prevalence of overweight and obesity, it is necessary to understand if there are problems related to body self-perception.¹¹ A better understanding of self-perception of body characteristics can contribute significantly to more effective health behaviors, including a healthy diet, which, in turn, could prevent disease and improve quality of life.²⁵ Therefore, in this study, body self-perception, anthropometric profile, and dietary self-efficacy were determined in young Peruvian adults.

Materials and Methods

Design, Context, and Participants

A descriptive cross-sectional study was conducted between January and March 2020 through a self-administered online survey sent through the WhatsApp messaging platform. A total of 400 participants were considered from an initial sample of 404, aged 18 to 59 years. A text message requesting participants' participation in the research was sent along with the survey web link available on SurveyMonkey Pro (SurveyMonkey.com, LLC, Palo Alto, CA). The survey description contained the objective of the study, the purpose of the data collection, and informed consent where it was explained to the participants that their participation in the study was voluntary, that their data will be used exclusively for research purposes and that they could withdraw from the study at any time if they so wished. Informed consent was obtained from the participants. Four participants were excluded for not responding adequately to some relevant data and for not being within the minimum age range considered for the study. The study was approved by the Research Ethics Committee of the Universidad Peruana Unión and registered under number 043–2019/UPeU/FCS. Finally, it was developed respecting the ethical aspects established by the Declaration of Helsinki.

Body Self-Perception

The assessment of the self-perception of the body was carried out using the method proposed by Stunkard and Stellard²⁶ and subsequently modified by Collins in 1991.²⁷ It comprises 9 male and female anatomical silhouettes, which become progressively more robust and represent different BMI ranges. Each silhouette is assigned a BMI from 17 kg/m² to 33 kg/m², where silhouette 1 is considered underweight; silhouettes 2–5, normal weight; silhouettes 6–7, overweight; and silhouettes 8–9, obese.²⁸ These figures, at the time they were shown, did not present the BMI values mentioned above. Participants were invited to select the silhouette that, according to their perception, corresponded to their body shape (perceived BMI) by asking them the question: What image do you identify with?; subsequently, the values of the perceived BMI were compared with those of the real BMI (measured BMI) obtained through weight and height, obtaining a new variable called “Body perception”, as mentioned in a previous study;²⁹ and was classified as follows: (a) “looks the same”, when the value is zero; (b) “looks thinner than it actually is”, when the value obtained is greater than zero; and (c) “looks fatter than it actually is”, when the value obtained is less than zero. In addition, they were asked

the following question: Which of those silhouettes would you like to have? (desired BMI). Likewise, the values of the “desired BMI” were compared with the real BMI, obtaining the variable “body satisfaction” and classified according to Montero³⁰ considering the following categories: (a) “Satisfaction”, when the value obtained is zero; (b) “body dissatisfaction due to excess weight”, when the value is different from zero and positive; and (c) “unsatisfied due to underweight”, when the value is different from zero and negative.³¹

Dietary Self-Efficacy

For the measurement of dietary self-efficacy, the Dieting Self-Efficacy Scale (DIET-SE) was used.²⁴ It is an 11-item instrument that measures the level of confidence that a person has in his or her ability to resist a variety of food temptations and follow a healthy diet to promote an adequate weight. The scale has been translated into Spanish and subsequently validated in a study of 807 participants.²⁰ The internal structure of the instrument is composed of three subscales: (1) high caloric food temptations (HCF), considering questions 3, 6, 7, and 10, that describe situations in which the individual is exposed to tempting foods with high energy density that may make it difficult to resist eating them; (2) the social and internal factors (SIF), regroups questions 1, 2, 5, and 9 that describe situations in which certain social or internal factors, such as being with friends or feeling tired, can make it difficult to resist the temptation to eat; (2) and negative emotional events (NEE), regroups questions 4, 8, and 11 and describe situations in which emotional discomfort may be the cause of unplanned eating. The reliability of the instrument according to Cronbach’s alpha for the subscales HCF, SIF, and NEE was 0.77, 0.72, and 0.70, respectively. The responses are recorded using a Likert scale from 0 to 4. The response alternatives were “not at all confident”, “not very confident”, “more or less confident”, “fairly confident”, and “very confident”. The DIET-SE scale is evaluated through obtaining the mean scores of the total of the items included in each factor. Scores can range from 0 to 33. A score of 20 or more was considered LDSE.²⁰

Data Registration Form

To determine the sociodemographic data, a registration form was used, consisting of 9 items divided into 4 sections considering the following variables: age, sex, origin, marital status, level of education, dietary patterns,³² hours of sleep, and level of physical activity.³³ Anthropometric data such as weight and height were also measured and recorded, which allowed the measurement of BMI (kg/m²). WHO cut-off points were used for BMI classification: (a) underweight, <18.5; (b) normal, 18.5–24.9; (c) overweight, 25–29.9; and (d) obese, ≥30.³⁴ The anthropometric data were collected by two professional dietitians in person.

Statistical Analysis

Statistical analyses were performed using the IBM SPSS statistical software package, version 26 (SPSS Inc., Chicago, IL, USA). The descriptive analysis of the sociodemographic data was performed using tables of absolute frequencies and percentages. Chi-square and Student’s *t*-test were used to compare the proportions of sociodemographic characteristics, hours of sleep, physical activity, dietary patterns, and BMI between men and women. Additionally, Kruskal–Wallis, *t*-student, and ANOVA statistical tests were used for differences in means.

Results

A total of 400 young adults were included in the study, with females being the most representative of the sample (52.5%, *n*=210). **Table 1** shows the sociodemographic data, lifestyle, dietary patterns, and anthropometric data of the participants. The mean age was 31.27 ± 9.25 for men and 28.18 ± 8.34 for women. Approximately 50.7% of the participants were from the coastal area of the country. The hours of sleep were less than recommended (6.82 ± 1.12). Approximately 78% of men reported physical activity between 1 to 2 times/week, 3 to 4 times/week, and daily compared to women (65.2%, *p*<0.05). The most representative dietary pattern in both sexes was non-vegetarian in 77%, of which 81.4% were women and 72.1% were men. Weight was significantly higher in men compared to women (70.6 ± 10.46 vs 60.14 ± 10.1, *p* = 0.000). A higher measured BMI was observed in men (25.04 ± 3.32 kg/m²) compared to women (24.78 ± 3.94 kg/m²).

Males and females presented LDSE at 62.6% and 61.4, respectively. Based on the measured BMI categories, 38.9% of men were overweight compared to women (27.6%), however, there were no significant differences (*p* >0.05).

Table 1 Sociodemographic Characteristics and BMI According to Sex of Participants

Variable	Male		Female		Total		P-value
	n/M	%/SD	n/M	%/SD	n/M	%/SD	
Age	31.27	9.25	29.18	8.34	30.17	8.84	0.018*
Origin							0.544
Coast	95	50.0	108	51.4	203	50.7	
Sierra	72	37.9	74	35.2	146	36.5	
Amazonia	23	12.1	28	9.5	51	12.8	
Level of education							0.281
Basic	51	26.9	46	22.0	5	24.6	
Technical	71	37.4	69	32.9	140	35	
Professional	68	35.7	95	37.1	129	32.3	
Marital status							0.321
Single	137	72.10	151	71.9	288	72	
Married	53	27.9	59	28.1	112	28.0	
Hours of sleep	6.70	1.18	6.93	1.07	6.82	1.12	0.351
Physical activity							0.017**
Never	40	21.1	73	34.8	113	28.2	
1–2 times/week	105	55.3	103	49.0	208	52	
3–4 times/week	33	17.4	25	11.9	58	14.5	
Daily	12	6.3	9	4.3	21	5.3	
Dietary patterns							0.027**
Vegetarians	53	27.9	39	18.6	92	23	
No-vegetarians	137	72.1	171	81.4	308	77	
Weight	70.62	10.46	60.14	10.1	65.12	11.54	0.000*
Height	1.66	0.06	1.55	0.05	1.60	0.07	0.000*
Measured BMI	25.4	3.32	24.78	3.94	25.07	3.67	0.088
Desired BMI	22.06	1.86	22.16	1.66	22.11	1.75	0.574
Perceived BMI	23.75	2.79	23.85	2.97	23.8	2.88	0.729

Notes: *Student's t-test (statistical significance <0.05). **Chi-square test (statistical significance <0.05).

Abbreviations: M, Mean; SD, Standard deviation, BMI measured, body mass index measured through weight and height; Desired BMI, desired body mass index; perceived BMI, perceived body mass index.

Approximately 66.9% of men stated that they are not satisfied with their body compared to women (57.6%), these differences were significant ($p < 0.05$). Something similar was observed regarding body self-perception where 43.7% of men underestimated their weight compared to women (25.7%), $p < 0.001$ (see Table 2).

Table 3 shows the difference between the variables age, measured BMI, perceived BMI, hours of sleep, and DIET-SE based on the categories of the variable “body satisfaction”. It was observed that age was significantly higher ($p = 0.000$) in those participants who reported “body dissatisfaction due to excess weight”. Highly significant differences were observed in measured BMI, being higher in the group reporting “body dissatisfaction due to excess weight” ($27.16 \pm$

Table 2 Analysis of the Variables DIET-SE, BMI, and Body Self-Perception According to Sex of the Participants

Variable	Female		Male		χ^2	P-value*
	n	%	n	%		
DIET-SE						
High self-efficacy	81	38.6	71	37.4	0.061	0.804
Low self-efficacy	129	61.4	119	62.6		
BMI						
Underweight	3	1.4	1	0.5	7.027	0.071
Normal	131	62.4	97	51.1		
Overweight	58	27.6	74	38.9		
Obesity	18	8.6	18	9.5		
Body satisfaction						
Body satisfaction	89	42.9	63	33.2	7.242	0.027*
Dissatisfaction due to low weight	15	7.1	7	3.7		
Dissatisfaction due to excess weight	106	50.5	120	63.2		
Self-perception						
Looks the same	134	63.8	95	50.0	14.759	0.000*
Overestimation of BMI	22	10.5	12	6.3		
Underestimation of BMI	54	25.7	83	43.7		

Note: *Chi-square test (statistical significance <0.05).

Abbreviations: DIET-SE, Dieting Self-Efficacy Scale; BMI, body mass index.

Table 3 Analysis of Anthropometric Variables and Dietary Self-Efficacy Based on Body Satisfaction Categories

Variable	Body Satisfaction			P-value*
	Body Satisfaction	Body Dissatisfaction for Low Weight	Body Dissatisfaction for Excess Weight	
Age	28 ± 8.5	28 ± 9.71	32 ± 8.63	0.000*
Measured BMI	22.68 ± 1.6	20.1 ± 1.33	27.16 ± 3.36	0.000*
Perceived BMI	22 ± 1.53	23 ± 1.62	22 ± 1.84	0.000*
Hours of sleep	6.9 ± 1.0	6.8 ± 1.07	6.8 ± 1.18	0.801
DIET-SE	21.8 ± 8.6	21 ± 8.9	22 ± 8.6	0.849

Note: *Kruskal-Wallis test.

Abbreviations: Measured BMI, measured body mass index; perceived BMI, perceived body mass index; DIET-SE, Dieting Self-Efficacy Scale.

3.36, $p = 0.000$). A higher DIET-SE score was observed in all three groups, however, it was even higher in participants who felt dissatisfied with their body due to excess weight (22 ± 8.6), ie, this group had LDSE.

Table 4 showed that age was significantly higher in the group that underestimated weight ($p = 0.000$). Those who were underestimated had significantly higher measured BMI (27.5 ± 4.2 , $p = 0.000$). With respect to the DIET-SE, elevated scores were observed in the three groups, however, there were no differences ($p > 0.05$).

The difference in the variables age, measured BMI, desired BMI, perceived BMI, and hours of sleep according to the DIET-SE categories is described (see Table 5). It was found that in those participants who presented low dietary self-efficacy,

Table 4 Analysis of Anthropometric Variables and DIET-SE Based on the Categories of Body Self-Perception According to Sex of the Participants

Variable	Body Perception			
	Looks the Same	Overestimated	Underestimated	p-value*
Age	29.6 ± 8.7	27.6 ± 9.3	31.7 ± 8.6)	0.000*
Measured BMI	24.0 ± 2.5	22.2 ± 2.2	27.5 ± 4.2	0.000*
Desired BMI	22.1 ± 1.6	22.4 ± 1.8	22.1 ± 1.8	0.562
Hours of sleep	8.4 ± 10.0	6.9 ± 1.1	8.5 ± 10.0	0.847
DIET-SE	21.8 ± 8.7	23.2 ± 7.7	20.8 ± 8.4	0.316

Note: *ANOVA.

Abbreviations: Measured BMI, measured body mass index; desired BMI, desired body mass index; DIET-SE, Dieting Self-Efficacy Scale.

Table 5 Analysis of Anthropometric Variables and Body Self-Perception Based on the DIET-SE Categories

Variable	DIET-SE		P-value*
	High Self-Efficiency	Low Self-Efficiency	
Age	30 ± 8.61	30.54 ± 9.21	0.516
Measured BMI	24.71 ± 3.28	25.3 ± 3.88	0.115
Desired BMI	22.1 ± 1.84	22.13 ± 1.61	0.883
Perceived BMI	23.6 ± 2.57	23.9 ± 3.05	0.324
Hours of sleep	6.8 ± 1.19	6.9 ± 1.03	0.357

Note: *Student's t-test.

Abbreviations: Measured BMI, measured body mass index; desired BMI, desired body mass index; perceived BMI, perceived body mass index.

the mean of measured BMI was a little higher, presenting overweight, compared to those who had high dietary efficacy (25.3 ± 3.88 vs 24.71 ± 3.28).

Figure 1 shows the analysis of participants' DIET-SE according to the three subscales (HCF, SIF, and NEE). Approximately 45.9% of respondents reported that they felt little confidence to resist high-calorie food temptations.

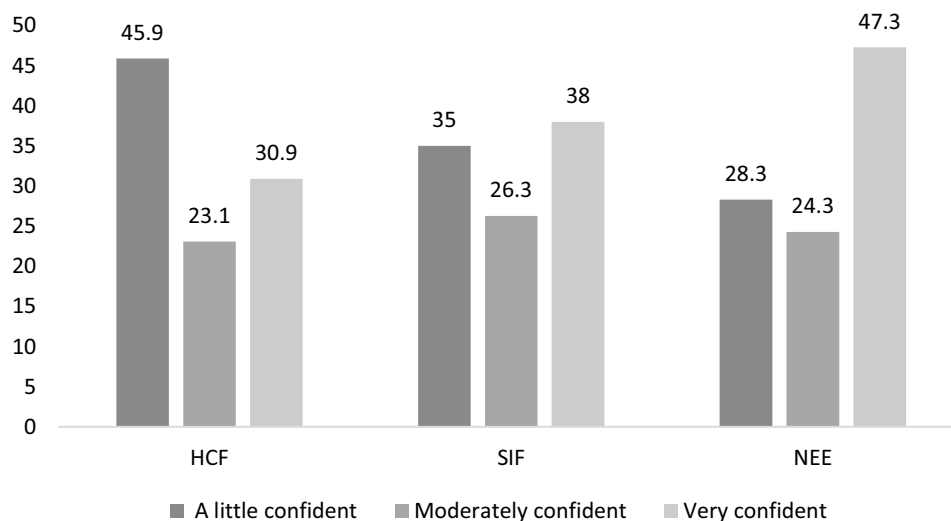


Figure 1 Analysis of the DIET-SE variable according to the three subscales.

Abbreviations: HCF, high caloric food temptations; SIF, social and internal factors; NEE, negative emotional events.

Similarly, 61.3% of the participants felt a little confident and more or less confident to resist temptations to eat in a social context. However, 47.3% reported being very confident to resist food temptations when they were in emotionally negative situations.

Discussion

Negative body self-perception is often characterized by dissatisfaction with body weight, which can affect dietary habits and lifestyle behaviors.¹¹ In fact, in an attempt to improve satisfaction, people often resort to unhealthy diets. Furthermore, it is suggested that body dissatisfaction may be an important factor in the adoption of healthy dietary behaviors.¹² Understanding body dissatisfaction may prove to be an important component in the prevention of overweight/obesity and unhealthy dietary habits.¹⁴ This study aimed to evaluate body self-perception, DIET-SE, and anthropometric profile in young Peruvian adults. In this study, age was significantly higher in those participants who reported body dissatisfaction and in those who underestimated current weight. These findings are supported by results from similar studies previously conducted in which it has been reported that older participants were more likely to underestimate current weight and report greater body dissatisfaction compared to younger participants.^{11,35} In one study, it was reported that participants who were 30 years old underestimated their body shape more and overestimated themselves less compared to those who were 20 years old.³⁶

Generally, it is assumed that issues related to body perception are linked only to women because most studies on this topic have evaluated women as the main study sample.³⁷ In the current study, more men reported body dissatisfaction. In addition, most underestimated current weight compared to women. These findings are supported by results from previous studies.^{36,38} Although much of the previous research related to body perception has focused on women, however, there is evidence that men not only underestimate their body weight, but also tend to be dissatisfied with their bodies.^{39,40} In a study that looked at adolescent males, it was found that more than two-thirds reported being dissatisfied with their bodies.⁴¹ This could be due to a social phenomenon where men want to be more muscular. In addition, there may be an idealization of a muscular and larger body on the part of men.^{23,42}

Lately, magazines and media have been focusing increasingly on men's appearance. The number of ads depicting men as sex objects has increased at a dizzying rate.³⁶ Today, the male body image is becoming more visible, muscular, and slender.³⁹ This socio-cultural vision is reinforced by the media, especially in sports television programs, which portray the male body as an object of admiration.²¹ Like women, social pressures to look good have made modern men more conscious of their physical appearance.⁴³ It is worth mentioning that studies have suggested that men's preoccupation with body perception may be more varied than that of women, because men generally show greater concerns about their body image, and these concerns are linked to weight, height, muscularity, thinness, and body shape.³⁶ The present study shows that not only women try to maintain a socially acceptable body shape, but also men. It is important to note that the current findings support the idea that men, like women, tend to be preoccupied with body weight. Therefore, it is necessary to implement intervention programs in the adult population and with emphasis on both genders to raise awareness about the importance of having a healthy weight.

Previous studies have shown that being aware of excess body weight is an important factor in attempts to achieve healthy weight loss.⁴⁴ In addition, it is suggested that advice given by experts to overweight people may have a greater effect if they are regarded as such.⁴⁴ One study found that although almost half (48%) of the population studied was overweight, only 22% perceived themselves as overweight.¹⁴ In fact, people with obesity who consider themselves to be at an appropriate and healthy weight may not attempt to undertake healthy weight loss measures and may be less interested in pursuing a healthy lifestyle that includes healthy eating and physical activity. Fortunately, in the current study, the results reported that the overweight participants were dissatisfied with their body due to excess weight, implying that they were aware of their current anthropometric status. However, we found that those participants who underestimated body weight had a higher measured BMI. This could be due to the fact that body underestimation leads to overweight or obesity.⁴⁵ Instead, overestimation may promote unhealthy weight control behaviors.⁴⁵

In general, most of the study participants presented LDSE. In addition, the DIET-SE score was higher in those who felt dissatisfied with their body and who overestimated their current weight. A high score on the DIET-SE scale reflects a LDSE. These results are in agreement with previous studies that have found that people with high BMI are more likely

to adopt unhealthy dietary habits to control weight and body shape compared to those with normal BMI,¹¹ which could generate several risks for developing associated diseases. On the other hand, in the present study, 57.6% of women and 66.9% of men were dissatisfied with their body. People experiencing body dissatisfaction may be eating inadequately,¹⁴ resorting to dangerous weight control methods, including disproportionate dietary habits, such as fasting, meal replacements, and use of drugs, such as diuretics.³⁶ Furthermore, in the current study, 45.9% of the participants reported that they felt little confidence to resist high-calorie food temptations. Similarly, 61.3% felt a little confident and more or less confident to resist temptations to eat in a social context. Positive body self-perception is linked to healthy lifestyles that include regular physical activity, adequate sleep, and eating habits. This study was conducted in young adults. Young adults with healthy lifestyles may have a better quality of life in later life. Therefore, it is suggested to implement a program to improve body self-perception, considering factors such as sex, age, and DIET-SE or eating habits for adequate weight control and obesity prevention.

Limitations

This study has some limitations. First, the cross-sectional design of the study does not allow causal conclusions to be drawn. Second, the use of convenience sampling represents a significant limitation, because the sample may not be representative of the general adult population in Peru. Thirdly, it is worth mentioning that, although the anthropometric data for calculating BMI were collected in person, However, considering that males nowadays pay great attention to body shape, especially muscle mass, it is possible that those with those who are overweight are simply participants with greater muscle mass. In addition, we have not considered other anthropometric measurements, such as waist circumference, fat mass measurement, and lean mass, which would be useful to assess the adipose tissue distribution of the participants, Therefore, future research should consider these anthropometric aspects as alternatives to BMI, because BMI is not a perfect measure that can provide a specific and direct perspective on body composition, body fat distribution, and muscle mass.⁴⁶ Finally, the Stunkard scale²⁶ was validated in a different sociocultural context and in white people, thus it is not known if its validity is significantly and adequately adjusted to evaluate body perception in a Peruvian sample. However, despite these limitations, we believe that the study has some strengths, for example, we included only participants who were evaluated anthropometrically by two professional dietitians in person. The fact that the participants had recently weighed a weight avoids any bias with respect to the measured BMI, which strengthens the reliability of the study's conclusions.

Conclusion

In Peruvian young adults, older participants tended to underestimate their weight; moreover, they were not satisfied with their body. In particular, excess body weight was higher in men; also, men were not satisfied with their body and were inclined to underestimate their body weight compared to women. On the other hand, those participants who were dissatisfied with their body and who underestimated their weight were more likely to have an elevated BMI compared to those with normal BMI. In general, all participants presented a LDSE, with a little higher proportion in men. In addition, the DIET-SE score was higher in those who felt "body dissatisfaction due to excess weight" and who overestimated their current weight. Finally, there was a higher proportion of participants who reported feeling little confidence to resist high-calorie food temptations. Given these results, in future research, assessment and long-term monitoring of dietary self-efficacy and body self-perception may be useful in understanding the etiology of obesity and addressing its determinants appropriately. The findings of the current study provide evidence for the need and importance of developing future programs of personalized therapeutic interventions to address these factors.

Funding

Open access funding provided by Universidad Señor de Sipán (DIRECTORY RESOLUTION N°015-2022/ PD-USS) and Universidad Peruana Unión (Grant 041- 2022/SA).

Disclosure

The authors declare that there are no conflicts of interest in this work.

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