



## Original Research

## Self-perceived body weight and weight status: analysis of concordance by age group and sex



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## ABSTRACT

**Objectives:** Previous studies suggest that there is discordance between actual weight status and body-weight perception. This fact has implications when it comes to designing public health interventions. The aim of this study was to estimate the prevalence of the different categories of weight status and body-weight perception and to analyse their concordance in a representative Spanish population sample. **Study design:** Cross-sectional study.

**Methods:** Data were sourced from the 2018 Galician Risk Behaviour Data System, with the target population being all persons aged 16 years and above. We collected data on self-perceived body weight and assessed weight status on the basis of body mass index (BMI). BMI was estimated using self-reported measures of weight and height. To estimate concordance, Cohen's kappa coefficient, both unweighted and weighted with Cicchetti weights, was calculated.

**Results:** Data were obtained for 7853 individuals aged 16 years and above, whereas the overall unweighted concordance was 0.393 (95%CI: 0.377–0.409), with an agreement percentage of 61.6%, weighted concordance was 0.503 (0.490–0.517), with an agreement percentage of 86.6%. The highest concordance between self-perceived body weight and weight status was observed in women. By age group, the highest concordance was observed in the youngest group (16–24 years) for the BMI categories of underweight and overweight, and in the 45–64 age group for the category of obesity.

**Conclusions:** The results highlight the existence of differences between self-perceived body weight and weight status, according to sex and age.

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## Introduction

Since the publication of Erikson's theory of psychosocial stages of development,<sup>1</sup> the influence of body image on the construction of personal self-concept has been widely studied, and the relationship between body and identity seems to be clearly established.<sup>2</sup> “Body image” is a multidimensional construct defined as “a

person's perceptions, thoughts, and feelings about his or her body” and depends on different factors, such as the cultural context, sex, social class, and ethnic origin.<sup>3,4</sup> Furthermore, appreciation and self-assessment of the body differs between different ages and territories.<sup>5–10</sup> Body-image disturbance has a clear influence on personal, psychological, and social life processes and directly affects quality of life.<sup>11–13</sup>

Body-image disturbance is defined as the misperception of the actual body image and includes two components: the perceptual component and the attitudinal component. The perceptual component can be defined as the disturbance in the way a person experienced her or his own body weight or shape.<sup>14,15</sup> Body-weight perception, defined by previous studies as the personal assessment

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of a person's weight as “underweight”, “normal weight”, or “overweight”,<sup>16</sup> regardless of the actual body mass index (BMI), mediates in personal assessment, self-esteem, diet, physical activity,<sup>17,18</sup> and even sexuality and affects all persons over their lifetime, from childhood to old age.<sup>19</sup> The disturbance of body-weight perception can also influence social activity or interaction with other people, particularly in individuals who have a body that does not conform to the societal standard.<sup>20</sup>

Earlier studies in different countries concluded that body-weight perception is related to the BMI,<sup>22–25</sup> and some of them suggested the discordance between actual weight status and body-weight perception.<sup>26–31</sup>

It should be noted that focussing on body weight loss and weight control to promote a healthy status may compromise healthy body image. Therefore, some authors propose to change this approach and encourage that health and well-being can be achieved regardless of weight. Thus, eating nutritious foods, stopping eating when satiated, or practicing sports are recommended as strategies to promote a healthy state.<sup>32</sup> However, it is also important to note that the potential discordance between real and perceived body weight may have implications as it could encourage the adoption of unhealthy or even dangerous lifestyles and behaviours.<sup>33,34</sup> In this context, with the aim of implementing public health interventions adapted to the context of each country, it could be useful to ascertain concordance between actual weight status, using BMI and body-weight perception at a population level. To this end, there are surveys available that can furnish population data that characterise the population by reference to its BMI. Even so, such surveys may have limitations, in a case where the population provides inaccurate information about its weight or height, or where these measures do not *per se* reflect weight status. Although body-weight perception, to our knowledge, has not been explored as a reliable measure of weight status. Considering both BMI and body-weight perception in studies and surveys could be useful for the implementation of effective strategies to control overweight and obesity.

To date, four studies have analysed the concordance between body-weight perception and weight status in Spain. Two of these were undertaken in a hospital context, one on patients visiting the dietitian and another on patients attending hospital courses on obesity;<sup>28,29</sup> two studies were conducted on university students.<sup>27,30</sup> There are thus no studies that have analysed this aspect in a representative population sample by sex and age in Spain. The main aim of this study was therefore to estimate the prevalence of the different categories of weight status defined on the basis of self-reported weight and height, and of body weight perception, and analyse the concordance between the two in a representative Spanish population sample aged 16 years and above.

## Methods

This is a cross-sectional study based on the 2018 Galician Risk Behaviour Data System (*Sistema de Información sobre Conductas de Riesgo/SICRI*).<sup>35</sup> Since 2005, 11 cross-sectional studies have been conducted within the *SICRI* framework on the resident population of Galicia (Spain) aged 16 years and above, based on telephone surveys administered by a computer-assisted telephone interviewing system.<sup>36</sup>

In 2018, the sample was selected by stratified random sampling, taking the Health-Card Holder Register, which has a population coverage of 97%, as the sampling framework. The sample size was calculated for each sex and age group, assuming a 50% prevalence, an absolute error of 3.5%, a 95% confidence level, and a design effect of 1.25. This resulted in a theoretical size of 980 individuals for each group, leading to a total sample size of 7840. The study design made

it possible to ensure representativeness by sex and age group (16–24, 25–44, 45–64, and 65 years and over).

Collection of anthropometric data was based on self-reported weight (in kilogrammes) and height (in centimetres) without clothes or shoes. With respect to body-weight perception, participants were asked which of the proposed expressions came closest to their opinion about their body: “*I think I'm fat*”; “*I think I'm a little overweight*”; “*I think my weight's about right*”; “*I think I'm a little thin*”; and “*I think I'm very thin*”.

Using the anthropometric measures of weight and height, BMI was calculated by means of the expression,  $BMI = \frac{\text{weight(kg)}}{\text{height(m)}^2}$ . The different categories that define weight status are those included by international agreement, i.e., underweight ( $BMI < 18.5 \text{ kg/m}^2$ ), normal weight ( $18.5 \leq BMI < 25 \text{ kg/m}^2$ ), overweight ( $25 \leq BMI < 30 \text{ kg/m}^2$ ), and obesity ( $BMI \geq 30 \text{ kg/m}^2$ ).<sup>37</sup> In this study, excess weight was defined as overweight or obesity.

We first estimated prevalences for each of the aforementioned weight-status categories, accompanied by their 95% confidence intervals (95% CIs), both overall and by sex and age. Prevalences and their 95% CIs were likewise calculated for the different categories of body-weight perception. The concordance between the two variables was then analysed. The categories were established by matching: underweight to the combination of “*I'm very thin*” and “*I'm a little thin*”; normal weight to “*I think my weight's about right*”; overweight to “*I'm a little overweight*”; and obesity to “*I'm fat*”. To analyse the concordance between body-weight perception and weight status measured with BMI, Cohen's kappa coefficient, unweighted and weighted with Cicchetti weights, was calculated for the case of two observers with four classification categories.<sup>38</sup> Concordance was calculated, both overall and by sex and age group, along with the respective 95% CIs. In addition, the percentage of disagreement due to underestimation or overestimation of the body weight was analysed.

We also analysed the concordance between the most extreme categories (underweight, overweight, and obesity), considering two observers and classifications in two categories. Underweight was defined as having a  $BMI < 18.5 \text{ kg/m}^2$  or the self-perception, “*I'm very thin*” or “*I'm a little thin*”; overweight was defined as having a  $BMI \geq 25 \text{ kg/m}^2$  or the self-perception, “*I'm a little overweight*” or “*I'm fat*”; and obesity was defined as having a  $BMI \geq 30 \text{ kg/m}^2$  or the self-perception, “*I'm fat*”. For each of the categories analysed, concordance was calculated, both overall and by sex and age group, along with the respective 95% CIs.

For interpretation of kappa-coefficient results, we used the scale proposed by Landis and Koch. This scale classifies agreement as slight (0.01–0.20), fair (0.21–0.40), moderate (0.41–0.60), substantial (0.61–0.80), or almost perfect (0.81–1.00).<sup>39</sup> Observed percentage agreement was also calculated.

Data analysis was performed using the Stata 17 and Epidat v4.2. computer software packages.

## Ethical aspects

This study was conducted in accordance with the standards of good practice. Ethics committee approval was not required due to the specific nature of this study. According to Spanish national and institutional legislation, observational studies that only use anonymous or anonymised data do not require ethics committee authorisation. In addition, the data used for this study are part of a public health program and depend on the Galician public administration. The participation in this study was voluntary and anonymous, guaranteeing total confidentiality of all participants. All participants were required to give their express verbal consent at the date of the survey. The study included telephone interviews,

**Table 1**

Prevalences of weight status categories, defined on the basis of self-reported BMI, and body-weight perception categories, with 95% confidence intervals (95%CI), both overall and by sex and age group.

	Weight status (% and 95%CI)		Body-weight perception (% and 95%CI)	
	Underweight		Self-perception of being thin	
<b>All</b>	1.6	(1.4–1.9)	8.6	(8.0–9.3)
Men	0.6	(0.4–0.8)	7.8	(7.0–8.7)
Women	2.6	(2.1–3.1)	9.3	(8.4–10.3)
16–24 years	6.7	(5.6–7.8)	15.9	(14.3–17.6)
25–44 years	1.9	(1.4–2.6)	9.7	(8.4–11.0)
45–64 years	0.7	(0.4–1.2)	5.9	(4.9–7.0)
65 years and above	0.9	(0.5–1.4)	8.5	(7.4–9.9)
	Normal weight		Self-perception of being normal weight	
<b>All</b>	42.0	(40.8–43.1)	46.0	(44.9–47.2)
Men	37.1	(35.5–38.6)	48.5	(46.9–50.2)
Women	46.4	(44.8–48.1)	43.8	(42.1–45.4)
16–24 years	71.1	(69.0–73.1)	62.6	(60.4–64.8)
25–44 years	53.2	(51.0–55.4)	51.6	(49.3–53.8)
45–64 years	36.1	(34.0–38.2)	41.3	(39.1–43.5)
65 years and above	29.0	(27.0–31.0)	41.2	(39.0–43.3)
	Overweight		Self-perception of being overweight	
<b>All</b>	39.9	(38.8–41.1)	37.8	(36.7–39.0)
Men	46.0	(44.4–47.7)	37.0	(35.4–38.6)
Women	34.3	(32.8–35.9)	38.6	(36.9–40.2)
16–24 years	17.6	(16.0–19.4)	19.6	(17.9–21.4)
25–44 years	34.2	(32.2–36.3)	33.9	(31.8–36.0)
45–64 years	43.5	(41.4–45.7)	42.5	(40.3–44.7)
65 years and above	47.8	(45.6–50.0)	41.6	(39.4–43.8)
	Obesity		Self-perception of being fat	
<b>All</b>	16.5	(15.6–17.4)	7.6	(7.0–8.3)
Men	16.3	(15.1–17.6)	6.7	(5.9–7.6)
Women	16.7	(15.5–18.0)	8.4	(7.5–9.4)
16–24 years	4.7	(3.8–5.7)	1.9	(1.4–2.7)
25–44 years	10.6	(9.4–12.1)	4.9	(4.0–6.0)
45–64 years	19.6	(17.9–21.4)	10.3	(9.0–11.7)
65 years and above	22.3	(20.5–24.2)	8.8	(7.6–10.1)

Abbreviations: BMI = body mass index; CI = confidence interval.

and the fact that participants agreed to participate in the research automatically implied their consent. Participants were fully informed of the purpose and objectives of the study prior to their participation.

**Results**

Data were obtained for 7853 individuals aged 16 years and above, with a 70% response rate; 50% of the sample were women; and the median age was 45 years (interquartile range: 25–65 years).

In terms of weight status, BMI obtained on the basis of self-reported weight and height showed that 1.6% (95%CI: 1.4–1.9) of the population were underweight, 42.0% (95%CI: 40.8–43.1) were normal weight, 39.9% (95%CI: 38.8–41.1) were overweight, and 16.5% (95%CI: 15.6–17.4) were obese. When it came to body-weight perception, 8.6% (95%CI: 8.0–9.3) saw themselves as being underweight, and 46.0% (95%CI: 44.9–47.2) saw themselves as being normal weight, whereas 37.8% (95%CI: 36.7–39.0) and 7.6% (95%CI: 7.0–8.3) saw themselves as being overweight and obese, respectively. The highest prevalence of underweight, taking both BMI and body-weight perception into account, was found among women; the highest prevalence of overweight was registered in men, though this was only taking BMI into account (Table 1).

The mean BMI of those who perceived themselves as thin was 22.0 kg/m<sup>2</sup> (95%CI: 21.8–22.3) in men and 20.5 kg/m<sup>2</sup> (95%CI: 20.2–20.8) in women. The mean BMI of those who saw themselves as fat was 31.9 kg/m<sup>2</sup> (95%CI: 31.4–32.5) and 32.3 kg/m<sup>2</sup> (95%CI: 31.7–32.9) in men and women, respectively (Fig. 1).

When the BMI and body-weight perception categories (underweight, normal weight, overweight, and obesity) were taken into account, the kappa coefficient ranged from fair to moderate on applying Landis and Koch's criteria (0.330–0.457) (Table 2). Weighting with Cicchetti weights resulted in a rise in concordance, both overall and for all sex and age groups. The highest concordance was observed in women (kappa index: 0.555 [95%CI: 0.537–0.574]) and in individuals aged 16–24 years (kappa index: 0.518 [95%CI: 0.487–0.549]) (Table 2).

The unweighted percentage of agreement observed between the categories of weight status and body-weight perception was 61.6%. Table 3 shows the percentage of disagreement for underestimation and overestimation of body weight overall, by sex and by age group. Of the 38.4% of individuals who did not perceive their weight to be the same as their BMI, 30.8% had an underestimation of their weight, and 7.5% had an overestimation. Underestimation was more common in men and in the older age group and overestimation, among women and in the younger age group (Table 3).

Table 4 shows the analysis of concordance between BMI and body-weight perception in the extreme categories (underweight, overweight, and obesity). When the category of underweight was considered, the concordance ranged from slight to fair. Concordance was fair only for overall, women, and the youngest individuals (age: 16–44 years). In the case of overweight, the kappa coefficient ranged from slight to moderate. Concordance was moderate only for the women and the youngest individuals (age: 16–44 years). In the obesity category, concordance was fair for all the categories analysed. Percentage agreement ranged from 59.9% to 95.0% (Table 4).

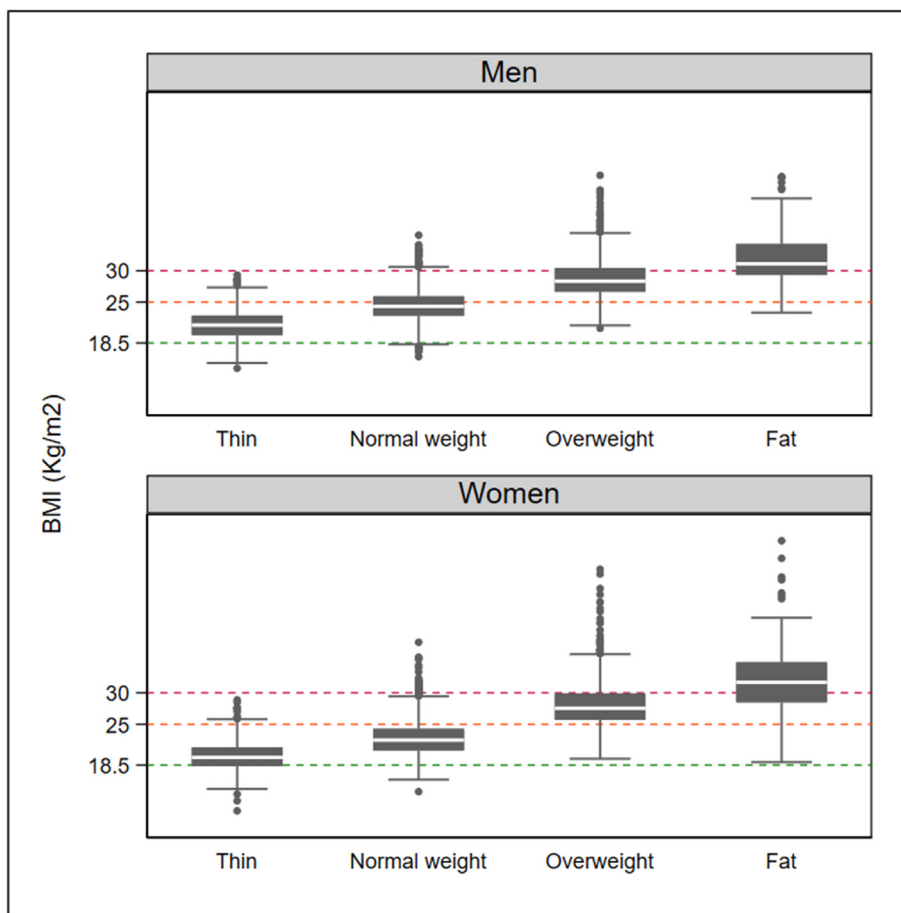


Fig. 1. Distribution of self-reported BMI according to categories of body-weight perception in men and women. Abbreviation: BMI = body mass index.

**Discussion**

The results of this study highlight the existence of differences between body-weight perception and weight status based on BMI. Overall, the highest concordance is seen in women and individuals aged 16–24 years; however, when obesity is considered, the highest concordance occurs in women and in the most advanced

**Table 2**  
Observed percentage agreement and kappa coefficients, both unweighted and weighted with Cicchetti weights, with 95% confidence intervals, between weight status categories defined on the basis of self-reported BMI, and categories of self-perceived body-weight perception.

	Agreement (%)	Kappa	95%CI
<b>Unweighted</b>			
All	61.6	0.393	(0.377–0.409)
Men	57.5	0.330	(0.308–0.353)
Women	65.7	0.457	(0.435–0.479)
16–24 years	71.0	0.430	(0.394–0.466)
25–44 years	64.2	0.388	(0.356–0.420)
45–64 years	59.5	0.373	(0.340–0.405)
65 years and above	65.1	0.421	(0.389–0.453)
<b>Weighted with Cicchetti weights</b>			
All	86.6	0.503	(0.490–0.517)
Men	85.3	0.452	(0.434–0.471)
Women	87.9	0.555	(0.537–0.574)
16–24 years	90.2	0.518	(0.487–0.549)
25–44 years	87.8	0.465	(0.439–0.492)
45–64 years	86.1	0.491	(0.464–0.517)
65 years and above	82.4	0.510	(0.483–0.538)

Abbreviations: BMI = body mass index; CI = confidence interval.

age groups (45 years and above). These differences may well have important implications for public health and the formulation of health policies. To our knowledge, this study is the only one to be conducted in Spain in which the sample was representative by sex and age of the population.

The results obtained indicate that, overall, there is an overestimate in the self-perception of thinness, and an underestimate in the self-perception of overweight, and of obesity in particular. Important sex-related differences in discordance are observed between self-perception and BMI-based weight status. In general, men more frequently perceive their weight as normal, and far less frequently, as excessive. Women, for their part, display a contrary trend, with a predisposition to consider themselves overweight. This finding is in line with the literature,<sup>40–43</sup> with the transcultural factor that characterises this dynamic as predominantly western,<sup>5,9,44</sup> and with a similar study conducted in Spain.<sup>45</sup> These results suggest that the differences between men and women respond to the social construct of gender and the roles deriving from this, and not to a mere biological question.<sup>46,47</sup> Hence, a systematic review that assessed body dissatisfaction in obese individuals as compared to normal-weight individuals, observed that the female gender displayed greater body dissatisfaction than did the male gender,<sup>48</sup> though it should be noted here that the concordance analysed in this study was in all cases higher for women, regardless of age group. These results agree with previous studies that assessed concordance between body-weight perception and objectively measured BMI and concluded that, overall, the percentage agreement was higher in women than in men.<sup>42,49,50,51</sup>

**Table 3**  
Unweighted observed percentage disagreement between weight status categories and body-weight perception categories due to underestimation or overestimation of the body weight.

	Disagreement (%)	
	Underestimation of the body weight	Overestimation of the body weight
All	30.8	7.5
Men	37.5	5.0
Women	24.2	10.1
16–24 years	20.5	8.5
25–44 years	26.8	8.2
45–64 years	32.3	8.2
65 years and above	43.5	5.4

Differences are also observed in terms of age. The youngest persons who present with obesity tend to perceive their weight as excessive, though they also tend more frequently to see themselves as thin when in reality they are not. This tendency to a misperception of the body weight tilted towards slimmness, especially among the obese population, is a widespread phenomenon that does not occur only in this study.<sup>43,52</sup> Young people can be more exposed to current beauty standards, which often promote slim bodies as the ideal, especially nowadays with the rise in social networks.<sup>53</sup> This may accentuate adolescents' dissatisfaction with their body weight or body image. Among the 34 studies analysed in a 2022 systematic review, a 2015 study involving Brazilian adolescents aged 10–17 years reported the highest prevalence of body-weight dissatisfaction, reaching 56.6%. Across all included studies, girls consistently showed higher levels of dissatisfaction than boys.<sup>21</sup> Furthermore, a 2017 systematic review, focussing on children and adolescents, found that self-reported body-weight dissatisfaction was more prevalent among overweight/obese individuals (ranging from 44% to 83%) than among those classified as underweight (ranging from 1.7% to 37%).<sup>54</sup> Adolescents and young adults often want to fit into social groups and may be aware of the fact that having a body weight within the ranges

**Table 4**  
Observed percentage agreement and unweighted kappa coefficient, with 95% confidence intervals, between weight-status categories defined on the basis of self-reported BMI and extreme body-weight perception categories.

	Agreement (%)	Kappa <sup>a</sup>	95%CI
<b>Underweight - Self-perception of being thin</b>			
All	91.1	0.256	(0.220–0.293)
Men	90.5	0.129	(0.086–0.171)
Women	91.7	0.364	(0.311–0.416)
16–24 years	86.7	0.347	(0.287–0.407)
25–44 years	91.1	0.220	(0.149–0.290)
45–64 years	94.4	0.144	(0.062–0.226)
65 years and above	92.2	0.130	(0.065–0.196)
<b>Overweight - Self-perception of being overweight or fat</b>			
All	71.1	0.367	(0.346–0.389)
Men	67.6	0.314	(0.284–0.344)
Women	74.6	0.426	(0.397–0.456)
16–24 years	84.6	0.490	(0.440–0.540)
25–44 years	74.5	0.430	(0.389–0.472)
45–64 years	65.9	0.305	(0.262–0.347)
65 years and above	59.9	0.194	(0.151–0.236)
<b>Obesity - Self-perception of being fat</b>			
All	87.6	0.345	(0.314–0.375)
Men	87.3	0.318	(0.274–0.361)
Women	87.9	0.370	(0.327–0.414)
16–24 years	95.0	0.217	(0.118–0.320)
25–44 years	89.6	0.283	(0.214–0.353)
45–64 years	83.9	0.380	(0.326–0.433)
65 years and above	82.1	0.332	(0.282–0.382)

Abbreviations: BMI = body mass index; CI = confidence interval.  
<sup>a</sup> The kappa coefficients shown were not weighted using Cicchetti weights, since only two categories are compared.

considered normal is more socially accepted and better valued. Consequently, even if they are overweight or obese, they may nonetheless have a tendency to see themselves as thin, in order to fit in with these social norms. Furthermore, body-weight perception can be influenced by subjective factors, such as the way in which a person sees himself/herself in the mirror or how he/she feels with respect to his/her body. This can be applied both to the fact that overweight or obese individuals may see themselves as thinner and to the fact that underweight individuals may see themselves as fatter than they really are. Additionally, it should be borne in mind that self-reported anthropometric measures can reproduce this observed tendency to underestimate weight and/or overestimate height.<sup>55–57</sup>

Something similar occurs with increasing age, but the reasons may be different. In the oldest age group, there is an overestimate of the “rightness” of weight, a greater difficulty to perceive overweight, and an underestimate of obesity. These results agree with previous studies.<sup>58</sup> This may be due to various factors. Older persons may be influenced by stereotypes and cultural beliefs linked to weight and body-weight perception. For instance, they may internalise the idea that carrying a little extra weight is normal or even a sign of good health. Moreover, as people grow older, they may possibly develop a greater acceptance of themselves and a higher self-esteem, regardless of their weight or body shape, or alternatively, the importance that they attach to body-weight perception may decrease with age.<sup>59</sup> These factors can lead to an overestimate of the “rightness” of weight and an underestimation of obesity among older adults. Inadequate perception of overweight, along with the increased prevalence of sedentary lifestyles and worse dietary habits, can lead to the maintenance of or an increase in obesity and related diseases.<sup>58</sup>

Attention should be paid to the young population, whose body-weight perception renders them especially vulnerable when it comes to triggering risk behaviours or the appearance of related diseases. This vulnerability is even greater for women, who, in addition to their own self-perception, have to deal with the prevailing aesthetic pressure.<sup>60</sup> A previous study conducted on university students, which described the relationship between body-weight perception and BMI, concluded that overweight and obese students were the ones who most underestimated self-perception of overweight, whereas normal-weight and underweight students overestimated it. By sex, 66.4% of women with normal weight overestimated their body-weight perception versus 12.7% of men.<sup>30</sup> Moreover, this discordance may have an impact on peoples' lifestyles. A previous study undertaken at schools in China showed that pupils who had a misperception of their body-weight perception were more prone to have unhealthy dietary and physical exercise habits.<sup>61</sup> However, this may be context-dependent since a study conducted on US students observed the opposite, i.e., obese subjects who saw themselves as thinner were more likely to engage in healthier behaviours.<sup>62</sup>

All the aforementioned may have implications when it comes to designing public health interventions. Knowledge of weight status is necessary to promote a shift in behaviour towards healthier habits. In view of the findings of this study, there is a need for strategies that inform people about their weight status. Health programs and interventions should also be targeted at the introduction of pictorial tools, such as the one designed by Collins<sup>63</sup> for preadolescent children, to improve perceived body image and weight, especially in the most extreme age groups, and at the adoption of healthy dietary and exercise guidelines.

The main advantage of this study lies in the sample's representativeness and size, which allow for analysis by sex and age group. This study's main limitation is not having objective and direct anthropometric measures and having used self-reported measures. It must be borne in mind that self-reported

anthropometric measures give rise to an underestimate of weight,<sup>64,65</sup> with the result that there might be a greater degree of discordance than that observed in this study. It is important to highlight the fact that BMI was used as the only measure of estimation of weight status and that it does not discriminate between fat mass and muscle mass. Hence, it cannot be ruled out that concordance might prove different if it were to be evaluated against other anthropometric measures, such as visceral fat. That said, having data on such measures on a self-report basis is difficult. Additionally, the characterisation of the population based on the BMI cut-off points has been performed by applying the same cut-off points regardless age. It should be taken into account that the reanalysis of data using the classification proposed by Cole<sup>66</sup> in the population under 18 years of age (5.8% of the sample) has shown negligible changes in the results obtained (data not shown).

In brief, body-weight perception appears to vary depending on age and sex. Due to the scant concordance observed between actual weight status, measured on the basis of BMI, and body-weight perception, self-perception would not seem likely to be a useful measure for establishing weight status at a population level or a reliable indicator for studies relating to obesity and overweight. In light of the results, health programmes and interventions should also be targeted at the introduction of tools designed to improve perceived body-weight perception, especially in the most extreme age groups, and at the adoption of healthy dietary and exercise guidelines. More research along these lines is called for, in order to be able to implement risk-behaviour prevention campaigns consistent with the concrete interests and needs of the population and public health measures adapted to the national context.

## Author statements

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### Ethical approval

This study was based on publicly available anonymised databases, and thus exempt from ethical compliance.

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### Competing interests

The authors declare that there are no conflicts of interest that are relevant to the publication of this paper.

### Availability of data

The data that support the findings of this study are openly available from <https://www.sergas.es/Saude-publica/SICRI-2018-Microdatos>.

### Authorship and originality

The corresponding author warrants that all aforementioned authors fulfil the criteria of authorship (<http://www.icmje.org/recommendations/browse/roles-and-responsibilities/defining-the-role-of-authors-and-contributors.html#two>) as defined by the International Committee of Medical Journal Editors. The corresponding author further warrants that the work described in this manuscript has not been published before and is not (nor will be) under

consideration elsewhere while under review with this journal; that all authors approved the present submitted version and that their institutions have no objections to the manuscript's contents.

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