Perception of overweight and obesity among Portuguese adolescents: an overview of associated factors

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Purpose: A national, representative school-based sample of Portuguese youth was used to both identify psychosocial indicators that distinguish obese and overweight adolescents from their peers, and key explainers of body image among obese and overweight adolescents. Methods: Data on 5697 sixth, eighth and tenth grade public school students, aged 11–16 years, from Portugal who participated in the 1998 (HBSC/WHO) survey of adolescent health were analysed. Body mass index (BMI) was calculated based on self-reported weight and height. Body image was measured using a body image tool with a sequence of seven body silhouettes progressing from very thin to overweight. BMI was calculated by reported weight/height (kg/m²), and was categorized based on Cole normalization curve. Adolescents whose BMI was above the 95th percentile (obese) and those with a BMI between 85 and 95 (overweight) were compared with the remainder. Separate analyses of psychosocial variables were conducted by gender, using the χ²-test, t-tests, ANOVA and multiple linear regression. Results: There was a significant difference in physical activity between obese and non-obese youth (P < 0.05). Girls reported dieting more than boys (P < 0.001), with 15.3% of overweight teens dieting versus 6% of non-overweight teens. Those classified as overweight were significantly more likely to depict themselves as not healthy (P < 0.001). A significantly greater proportion of obese/overweight versus non-overweight youth reported difficulty in making friends (P < 0.001). BMI (β = 0.491; P = 0.000), age (β = −0.413; P = 0.000), involvement in dieting (β = 0.110; P = 0.000) and attitude toward appearance (β = 0.032; P = 0.007) were significantly associated with body image. Conclusions: Inaccurate perceptions of the need to diet, poorer self-perceived health status and potential social isolation of those who are overweight were found. The importance of these findings to health promotion strategies is discussed.

Keywords: adolescence, body image, obesity, overweight, psychosocial factors

Evidence seems to suggest that in the 20th century, high-fat food intake has increased and that at the same time, energy expenditure has declined due to increasingly sedentary lifestyles. It is known that obesity is environmentally influenced in part and that a sedentary lifestyle and sustained physical inactivity may be risk factors for obesity in youth. Elevated television viewing has already been identified as an important promoting factor for obesity in children. Thus, changes in physical activity and sedentary behaviour seem critical in treating adolescent obesity. Goodman and Whitaker showed that depressed adolescents are at increased risk for the development of and persistence of obesity during adolescence. Other studies have also suggested a positive association between depression in adolescence and BMI during adulthood, and between chronic obesity and oppositional defiant disorder. Unfortunately, most studies trying to understand the shared biological and psychosocial determinants of obesity, owing to their cross-sectional design, are unable to distinguish causal relationships. Whether factors such as low self-esteem, poor body image or even depression lead to obesity or whether obesity causes them, remains unclear. A better understanding of determinants of obesity may inform its prevention and treatment. Therefore, there is need for studies providing psychosocial indicators that may distinguish obese and overweight adolescents from their peers, and identify key explainers of body image among these adolescents.

What psychosocial indicators distinguish obese and overweight adolescents from their peers? Data from the Portuguese Health Behaviour in School-Aged Children (HBSC) survey, a World Health Organization (WHO) collaborative study, was used to empirically investigate some psychosocial indicators that may help distinguishing obese and overweight adolescents.

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A adolescent obesity has risen dramatically in western countries during the last two decades, a concerning finding given its associated health complications. Obesity in children and adolescents represents one of the most frustrating and difficult diseases to treat. Currently, in the USA, about 11% of US children and adolescents are classified as obese, defined as having a body mass index (BMI) above the 95th percentile relative to gender- and age-specific national reference data. In Europe prevalence is lower, but is increasing fast. Among obese adolescents, the most widespread consequences of obesity are psychosocial. Obesity in adolescence carries with it negative connotations leading to important psychosocial sequelae, in addition to medical complications. Several studies have shown clearly that obese adolescents become targets of early and systematic discrimination, and they are ranked lowest as those whose BMI was above the 95th percentile (obese) and those with a BMI between 85 and 95 (overweight) were compared with the remainder. Separate analyses of psychosocial variables were conducted by gender, using the χ²-test, t-tests, ANOVA and multiple linear regression. Results: There was a significant difference in physical activity between obese and non-obese youth (P < 0.05). Girls reported dieting more than boys (P < 0.001), with 15.3% of overweight teens dieting versus 6% of non-overweight teens. Those classified as overweight were significantly more likely to depict themselves as not healthy (P < 0.001). A significantly greater proportion of obese/overweight versus non-overweight youth reported difficulty in making friends (P < 0.001). BMI (β = 0.491; P = 0.000), age (β = −0.413; P = 0.000), involvement in dieting (β = 0.110; P = 0.000) and attitude toward appearance (β = 0.032; P = 0.007) were significantly associated with body image. Conclusions: Inaccurate perceptions of the need to diet, poorer self-perceived health status and potential social isolation of those who are overweight were found. The importance of these findings to health promotion strategies is discussed.
Adolescents were categorized in normal, overweight (yes or no), and obese (yes or no) according to their BMI, using the cutoff points for age and gender defined by Cole and colleagues.


descriptively

BMI increases from about age 6 years, through puberty, it is necessary to have age- and sex-specific definitions of overweight and obesity. The International Obesity Task Force recommends BMI references of averaged BMI-for-age data for measured children aged 2–18 years, across six countries (Brazil, Great Britain, Hong Kong, The Netherlands, Singapore and the USA), and projected the centile curves through the adult cut-off points at age 18 years (25 at the 85th centile and 30 at the 95th centile) in an effort to produce new internationally appropriate references. Adolescents whose BMI was above the 95th percentile (obese) and those with a BMI between 85 and 95 (overweight) were compared with the remainder. Identification of perceived body image was used as an interval variable (1 to 7), with a maximum value meaning a maximum of overweight, but was also categorized in three groups (thin, average and overweight), for some of the analyses. A complete picture of previous uses of these items and their psychometric properties can be found in the international study report. For the purpose of this study we removed all the adolescents that had missing values on ‘age’, ‘perceived weight’ and ‘perceived height’, as well as adolescents <11 years old. The present sample thus included 5697 adolescents.

RESULTS

Descriptive data are summarized on tables 1 and 2.

Gender, age and BMI

The sample was divided into two groups, a younger (11–13 years old) and an older one (14–17 years old). We obtained 2666 adolescents (46.8%) belonging to the first group (mean age 12.6 years; SD 0.89) and 3031 (53.2%) belonging to the second group (mean age 15.5 years; SD 0.90). Within the younger group, the mean BMI was 19.46 (SD 3.12), while in the older group BMI mean was 20.68 (SD 2.75).

Boys included in this sample (n = 2671), had a BMI mean of 20.1 (SD 3.03), with a mean age of 14.16 years (SD 1.70), while girls (n = 3026), had a BMI mean of 20.2 (SD 2.95), with a mean age of 14.16 (SD 1.67).

BMI, overweight and obesity

From the total 5697 adolescents included in the sample, 89 (1.6%) were classified as obese. There were more obese girls (51.7%) compared with boys (48.3%). The number of adolescents classified as overweight was 822 (14.4%). There were more overweight males (53.5%) compared with females (46.5%). Overweight was more common among boys than among girls [x^2(1) = 17.026; P < 0.001]. Both obesity [x^2(1) = 20.899; P < 0.001] and overweight [x^2(1) = 38.707; P < 0.001] were more common among younger teens (age 11–13 years): 2.4% obese and 17.5% overweight among the youngest, and 0.9% obese and 11.7% overweight among the oldest, respectively.

In the obese group (n = 89) the mean BMI was 29.96 (SD 2.84), while in the non-obese group (n = 5608), the mean BMI was 19.95 (SD 2.72). Mean age in the obese group was 13.2 years (SD 1.54), while in the non-obese group was 14.2 years (SD 1.68).

Table 1 Descriptive data for BMI, PA index and age

<table>
<thead>
<tr>
<th>Variable</th>
<th>Mean</th>
<th>Standard deviation</th>
<th>Range</th>
</tr>
</thead>
<tbody>
<tr>
<td>BMI (kg/m^2)</td>
<td>20.11</td>
<td>2.99</td>
<td>12.1–40.8</td>
</tr>
<tr>
<td>PA index (week days)</td>
<td>8.95</td>
<td>5.96</td>
<td>0–30</td>
</tr>
<tr>
<td>Age (years)</td>
<td>14.2</td>
<td>1.7</td>
<td>11.2–17.2</td>
</tr>
</tbody>
</table>
In the overweight group \( (n = 822) \) the mean BMI was 24.9 (SD 2.51), while in the non-obese group \( (n = 4875) \), it was 19.3 (SD 2.22). Mean age in the overweight group was 13.7 years (SD 1.61), while in the non-obese group it was 14.2 years (SD 1.68) (table 3).

**Physical activity**

There was a significant difference between obese and non-obese \( (n = 5566; \; t = 1.977; \; P < 0.05) \) in the amount of physical activity practise (PA index). The obese group had a lower PA index (mean 7.7; SD 5.29) compared with the non-obese group (mean 8.97; SD 5.97).

**Sedentary behaviour: watching TV**

Considering sedentary behaviour, 71.7% of the adolescents were watching up to 3 h a day, and 28.3% were watching ≥ 4 h. There were no significant differences in TV watching between obese \( [\chi^2(1) = 0.565; \; P = 0.452] \) and overweight \( [\chi^2(1) = 0.687; \; P = 0.407] \) adolescents, compared with the rest of the sample.

**Dieting behaviour**

Some (7.3%) of adolescents reported being on diet in order to lose weight, while 22.3% reported not being on diet but that they needed to lose weight. Girls reported dieting more than boys (25.3% of boys and 74.7% of girls) \( [\chi^2(1) = 83.721; \; P < 0.001] \), 15.3% of overweight teens were dieting and 6% of those who were not overweight were also dieting. Among those who reported not being on diet because their weight was fine, 36.4% were classified as overweight. Those who reported dieting, or not dieting but feeling they should diet, more often were overweight \( [\chi^2(2) = 521.761; \; P < 0.001] \). The same was seen when adolescents were analysed separately by gender: 67.6% of girls reported not dieting but feeling they should and 32.4% of boys reported the same \( [\chi^2(1) = 138.996; \; P < 0.001] \).

**Perceived health**

Health was perceived as good or very good by 95.8% of the adolescents. Those who were classified as overweight more often considered themselves not healthy \( [\chi^2(1) = 36.013; \; P < 0.001] \), 8.1% of those who were classified as overweight considered themselves as not healthy, compared with 3.5% of the non-overweight.

**Number of close friends**

About 74.4% of the teens report having two or more close friends. There was no statistically significant difference between the number of close friends and obesity \( [\chi^2(1) = 0.625; \; P = 0.429] \). Conversely, there was a statistically significant difference between the number of close friends and overweight: 75% of non-overweight reported having two or more friends and 71.2% of overweight \( [\chi^2(1) = 5.24; \; P = 0.022] \).

**Finding new friends**

Some 87.7% of the teens reported it being easy to find new friends. It was more difficult to make friends both for obese \( [\chi^2(1) = 10.605; \; P < 0.001] \) and overweight \( [\chi^2(1) = 10.645; \; P < 0.001] \) compared with their non-obese and non-overweight peers. While 23.6% of obese adolescents reported finding it difficult to make new friends, only 12.2% of the non-obese peers reported this. Overweight adolescents also report finding it difficult to make new friends (15.8%) more than their non-overweight peers (11.7%).

**Changing one’s body**

Overweight teens were more likely to want to change something about their bodies: 49.1% of overweight teens were more likely to want to change something about their bodies, which was also true for 43.0% of the non-overweight \( [\chi^2(1) = 10.576; \; P < 0.001] \).

**Perception of body image**

About 90.8% of the teens reported having an average opinion about their body. Statistically significant differences were found between the perception teens had of their own bodies depending on whether or not they belonged to the overweight group \( [\chi^2(3) = 501.572; \; P < 0.001] \). Overweight teens less often reported perceiving their bodies as thin (3.2%) or ideal (23.6%), and less often reported ‘don’t think about it’ (7.8%). Instead, they more often reported perceiving their bodies as overweight (65.5%).

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**Table 2** Descriptive data for psychosocial variables (frequencies)

<table>
<thead>
<tr>
<th>Dieting behaviour</th>
<th>Yes</th>
<th>No</th>
<th>No but I need to</th>
</tr>
</thead>
<tbody>
<tr>
<td>Opinion about physical appearance</td>
<td>31.4% Good/very good</td>
<td>55.8% Average</td>
<td>5.3% Bad</td>
</tr>
<tr>
<td>Perception of body image (choice of pictures)</td>
<td>4.7% Thin</td>
<td>90.8% Average</td>
<td>4.6% Overweight</td>
</tr>
<tr>
<td>Hours watching TV</td>
<td>71.7% Up to 3h/day</td>
<td>28.3% &gt; 4h/day</td>
<td></td>
</tr>
<tr>
<td>Number of close friends</td>
<td>25.6% None or one</td>
<td>74.4% Two or more</td>
<td></td>
</tr>
<tr>
<td>Easy find new friends</td>
<td>87.7% Easy</td>
<td>12.3% Difficult</td>
<td></td>
</tr>
<tr>
<td>Wants to change one’s body</td>
<td>43.9% Yes</td>
<td>56.1% No</td>
<td></td>
</tr>
</tbody>
</table>

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**Table 3** Descriptive data for BMI and age differences

<table>
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<th></th>
<th>Mean</th>
<th>Standard deviation</th>
<th>Range</th>
</tr>
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<tbody>
<tr>
<td><strong>Obese (n = 89)</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>BMI (kg/m²)</td>
<td>29.96</td>
<td>2.84</td>
<td>25.8–40.8</td>
</tr>
<tr>
<td>Age (years)</td>
<td>13.2</td>
<td>1.54</td>
<td>11.3–16.9</td>
</tr>
<tr>
<td><strong>Overweight (n = 822)</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>BMI (kg/m²)</td>
<td>24.9</td>
<td>2.51</td>
<td>20.8–40.8</td>
</tr>
<tr>
<td>Age (years)</td>
<td>13.7</td>
<td>1.61</td>
<td>11.2–17.2</td>
</tr>
<tr>
<td><strong>Non-obese (n = 4875)</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>BMI (kg/m²)</td>
<td>19.3</td>
<td>2.21</td>
<td>12.1–26.2</td>
</tr>
<tr>
<td>Age (years)</td>
<td>14.2</td>
<td>1.68</td>
<td>11.2–17.2</td>
</tr>
</tbody>
</table>
**Opinion about physical appearance**

About 55.8% of the teens reported an average opinion about their physical appearance. Among obese adolescents, 1.1% reported having a very good or fairly good physical appearance, 1.5% having an average, 3.3% not having a good appearance and 2.6% did not think about it. Among overweight adolescents, 12.1% reported having a very good or fairly good physical appearance; 14.8% having an average, 25.0% not having a good appearance and 13.5% did not think about it. Both obese ($\chi^2(3) = 11.348; P < 0.01$) and overweight ($\chi^2(3) = 35.447; P < 0.001$) teens less often reported having a good appearance and more often reported having a bad appearance.

**Perception of body image (choice of body silhouettes)**

A table with seven body silhouettes increasingly overweight was printed on the questionnaire (for more details see Collins16). The 7-point scale was categorized into three groups (thin, average and overweight). A group of 254 teens (4.7%) considered themselves 'thin'; of these, 67.3% were females, 85.4% belonged to the older group and 98.8% considered themselves as not being overweight. All of them considered themselves as not being obese. In the group who considered themselves 'average', 4948 teens (90.8%) were included; of these, 53.7% were females, 53.0% belonged to the older group, 87.7% considered themselves as not being overweight and 99.1% considered themselves as not being obese. In the group who considered themselves 'overweight', 250 teens (4.6%) were included; of these, 39.6% were females, 60.4% belong to the younger group, 68% considered themselves as being overweight and 16.8% considered themselves as being obese. The BMI of those who identified themselves as thin on the picture was 18.12 (SD 2.14), in the average groups was 20.03 (SD 2.78), and at the overweight group was 24.31 (SD 3.84).

The one-way ANOVA and Schefee’s post hoc test for these categories in the perception of body image (thin, average or overweight) showed statistically significant differences in BMI $F(2,5449) = 344.154; P < 0.001$. The group of teens who identified their body shape as average had a significantly higher BMI (mean BMI 20.03; SD 2.78) than the thin group. The group which identified themselves as overweight had a higher BMI (BMI mean 24.31; SD 3.84) than the group which identified themselves as thin and than those who identified themselves as average. In all the three groups (thin, average and overweight), BMI varied significantly. There was a good agreement between the classification of obesity based on the perceived BMI and the choice of the most overweight pictures [$\chi^2(1) = 391.1; P = 0.000$].

This same one-way ANOVA and Schefee’s post hoc test for these categories in perception of body image (thin, average or overweight) also showed statistically significant differences for age. The more frequent identification of a overweight picture as similar to own body shape was significantly more frequent in younger teens $F(2,5449) = 94.826; P < 0.001$. In all the three groups (thin, average and overweight), age varied significantly. In the thin group, the mean age was 15.45 years (SD 1.41); in the average group they were younger (mean age 14.17 years; SD 1.67); and in the overweight group they were even younger (mean age 13.52 years; SD 1.46). Multiple linear regression was used to search for associations with the perception of body image (considered in this particular analysis as a 7-point interval variable), aiming at understanding which of the variables had stronger associations with the way these teens see themselves. Age, gender, diet behaviour, physical appearance and BMI explained the perception of body image variance in 34.9% (adjusted $r^2 = 0.349$). All these variables were significantly associated with perceived body image, except gender.

**DISCUSSION**

Although obesity is not as prevalent in Portugal compared with other western countries, its incidence is increasing fast. With this increase come challenges for prevention and intervention. This study used a large sample of adolescents, and the sampling procedures helped to ensure a nationally representative sample. Description of calculations about the representativeness of HBSC national samples was detailed in Roberts et al.19

BMI is considered a reasonable measure with which to assess fatness in children and adolescents.20,21 Another strength of this study is the good concordance between the classification of obesity based on the perceived BMI and the identification with the fattest pictures.

This study has a number of limitations that should be considered when interpreting the results. First, the variables used in this study were developed post hoc from an existing survey. Secondly, the findings are based entirely on adolescents’ self-reports and self-perceptions, and biases in perception and reporting cannot be ruled out. However, according to other studies,22–25 self-reported height and weight have been shown to be relatively consistent with physical examination for measures of height and weight. The problem with self-report is that the obese tend to underreport their weight, resulting in a lower prevalence of obesity. Therefore, the prevalence is probably higher than reported herein. Also, minor gender differences in reporting may occur, with some boys overestimating their weight and some overweight girls underestimating. An additional limitation of this study is the lack of pubertal indicators to adjust the prevalence of overweight in the timing of maturation. Adjustment for the timing of maturation may be important, because overweight status in girls is strongly associated with earlier maturation while for boys early maturation is associated with a low BMI. Finally, because the study was cross-sectional we are unable to draw conclusions about the direction of causality between the variables of interest.

The fact that perception of being overweight was more common among boys than among girls in our study could be explained by the low age of the respondents. As we would expect, the obese were less physically active compared with the non-obese. In contrast with what has been amply described perviously,8,9 no significant difference was found in the amount of time spent watching TV between obese and overweight adolescents and the rest of the sample. This is possibly because of the high amount of time spent watching TV by the entire sample of adolescents. Particularly striking was the percentage

<table>
<thead>
<tr>
<th>Beta</th>
<th>t</th>
<th>Significance</th>
</tr>
</thead>
<tbody>
<tr>
<td>BMI</td>
<td>0.491</td>
<td>41.16</td>
</tr>
<tr>
<td>Gender</td>
<td>-0.019</td>
<td>-1.629</td>
</tr>
<tr>
<td>Age</td>
<td>-0.413</td>
<td>-34.94</td>
</tr>
<tr>
<td>Physical appearance</td>
<td>0.032</td>
<td>2.718</td>
</tr>
<tr>
<td>Diet behaviour</td>
<td>0.110</td>
<td>9.40</td>
</tr>
<tr>
<td>Constant</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

a: Excluding the alternative ‘do not think about it’.
NS: not significant.
of teens who were dieting despite not being overweight, and the even higher percentage who were classified as overweight and reported not being on diet because they believed their weight was fine. This group represents a challenge for intervention. Moreover, there is need for further research on the interplay between anorexia and obesity. As described by other authors,† a vast number of associations between overweight/obesity and psychosocial factors was found. Our results indicated that it was more difficult for obese and overweight adolescents to make new friends compared with their non-obese and non-overweight peers. Furthermore, those classified as overweight considered themselves more often as not healthy, although perception of excess weight was unrelated to personal perceptions of happiness. These data confirm what other researchers have already identified. There is need for deeper exploration of the dynamics behind these differences.

Both obese and overweight teens were significantly more likely to report a negative attitude toward appearance, and overweight teens were also more likely to report a wish to change something about their bodies. Interestingly, the more frequent identification of a fatter picture as similar to one’s own body shape, happened significantly more in younger teens. BMI, age, involvement in dieting and evaluation of one’s physical appearance were found to be key explainers of body image among these adolescents, and good predictors of the way these teens see themselves. BMI, involvement in dieting and evaluation of appearance were positively associated, while age was negatively associated. Moreover, our results indicated that age, gender, dieting, evaluation of one’s appearance and BMI explained body image variance in 34.9%. This alerts us to the need for an early intervention that considers the gender differences around this topic.

Those with higher BMI values identified themselves with the overweight options in the perception of body image chart. In the same way, those who were dieting also identified themselves as being one of the overweight options. Interestingly, older adolescents more often identified their body image as one of the thinner alternatives. This fact is probably associated with a more accurate perception in older ages.

It has already been shown that early onset of obesity has an adverse effect on body image in adult life, and it has been suggested that early onset of obesity increases the risk of body dissatisfaction, which in turn impairs self-esteem.‡ The increased risk of body dissatisfaction among obese adolescents suggests another area of investigation into protective factors against overweight and obesity. These results also suggest that strategies to prevent adolescent obesity and overweight must take into account a deeper knowledge of psychosocial issues in order to be able to delineate more effective programs for assessing and treating overweight teens.

Our findings related to inaccurate perceptions of the need to diet, poorer self-perceived health status and potential social isolation of those who are overweight underscore the importance of health promotion strategies to enhance the capacity of overweight youth to negotiate the social demands of adolescence.

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Key points
- This paper aims to identify psychosocial indicators that distinguish obese and overweight adolescents from their peers, and key explainers of body image among obese and overweight adolescents.
- Inaccurate perceptions of the need to diet, poorer self-perceived health status, and potential social isolation of those who are overweight were found.
- Body mass index, age, involvement in dieting and attitude toward appearance were significantly associated with body image.
- One of the implications of these results is the need to start prevention and management of adolescent overweight and obesity earlier, thus decreasing the potential for associated medical and psychosocial problems.
- Our findings underscore the importance of health promotion strategies to enhance the capacity of overweight youth to negotiate the social demands of adolescence.

References

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