OVERWEIGHT, OBESITY, AND BODY WEIGHT PERCEPTION AMONG CZECH ADOLESCENTS: A TWO-DECADE ANALYSIS, HBSC STUDY 2002–2022

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SUMMARY

Objectives: Excess body weight and weight misperception in adolescents are associated with various physical and mental health risks. This study analysed trends in overweight, obesity, body image, and body weight perception among Czech adolescents between 2002 and 2022, considering gender, age and socioeconomic status (SES).

Methods: Data were retrieved from the questionnaire of the Health Behaviour in School-aged Children (HBSC) study conducted in 2002, 2006, 2010, 2014, 2018 and 2022 (N = 52,363; 49.9% girls). The difference test between two proportions was used to assess time trends in weight status (WS), body image and body weight perception across gender and SES groups. Logistic regression analysis was performed to examine the likelihood of being overweight/obese, and underestimating or overestimating WS.

Results: Between 2002 and 2022, overweight and obesity increased significantly, while non-overweight rates declined across both genders and SES groups, with a greater rise among boys and adolescents from low SES backgrounds. In 2022, more adolescents, regardless the gender and SES, perceived their body as "too thin" compared to 2002. Over the 20-year period, underestimation of WS increased while overestimation decreased among both girls and boys and across all SES groups. Accurate perception of WS rose among girls but worsened among boys. Girls were less likely than boys to be overweight/obese or to underestimate their WS but had higher odds of overestimating it.

Conclusions: The significant rise in overweight and obesity, especially in boys and adolescents from low SES backgrounds, during the last 20 years points out to socioeconomic disparities and should be taken into account when creating new policies. An improvement in correct perception of WS among girls and a decline in overestimating WS across genders and SES groups could help reduce risks of developing mental health problems/eating disorders. Conversely, an increase in underestimation of WS may contribute to weight-related health risks.

Key words: overweight, obesity, weight perception, adolescents, HBSC, trends

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INTRODUCTION

Excess body weight in adolescents is a serious health concern associated with multiple physical and mental health issues (1, 2). Studies show that around 80% of obese adolescents continue to be obese in adulthood (3), increasing the risk of lifelong health complications (4). Data from the international 2021/2022 Health Behaviour in School-aged Children (HBSC) study indicated that about 22% of adolescents were overweight or obese, with a higher overall prevalence among boys (27%) than girls (17%) and among those from less affluent families (5). Substantial cross-country differences have been observed in the trends of youth overweight and obesity over the last few decades (6–9). According to multinational studies, about half of the predominantly European countries showed no significant change in overweight and obesity prevalence, while the other half noted an upward trend, with this increase being especially evident in Eastern Europe (6–8). In Czechia, significant increases in excess weight and obesity prevalence were observed among adolescents between 2002 and 2018 (10, 11). However, the Czech trend stabilized from 2018 to 2022, showing no significant change across gender or socioeconomic status (SES) levels in this period (12). Given these varying trends, continuous monitoring of youth weight levels is crucial for early intervention, and this study provides a comprehensive 20-year comparison to expand existing research.

In addition to weight status (WS) itself, body weight misperception, including both overestimation and underestimation of actual body weight, is common issue among youth (13) and can have serious negative health implications that may persist into adulthood (14–16). Overestimation of body weight in adolescents often leads to unhealthy behaviours (15, 16), body dissatisfaction, lower self-esteem (16), and mental health issues (14). Underestimating weight status has also been associated with mental health outcomes (14) as well as an increased risk of weight-related

physical health complications (17). Cross-national time-trend data indicate that adolescents' perception of body weight has changed over time, reflecting broader shifts in population weight trends (9, 18). Studies comparing international trends noted an increase in the underestimation of WS and a decrease in overestimation for both genders, with more pronounced trends observed among girls (9, 18). Understanding these trends is essential as they can have significant implications for addressing body image issues, promoting healthy behaviours, and preventing the development of eating disorders and psychological problems among young people (14). No study has examined changes in perceived WS and the discrepancy between perceived and actual body weight in Czech youth based on gender, age and family SES. Therefore, to further explore these trends, this study aimed to examine trends in overweight, obesity, body image, and body weight perception (accurate perception and misperception) among Czech adolescents from 2002 to 2022 in relation to gender, age category and family SES, using data from the HBSC study.

MATERIALS AND METHODS

Study Sample and Design

Data for analyses were retrieved from the Czech HBSC study, a cross-national research project conducted every four years in collaboration with the World Health Organization (WHO) (5, 19). The HBSC study collects self-reported data on health and health-behaviours such as WS, physical activity, body image, and family affluence, from adolescents aged 11, 13, and 15 years (5, 19). It follows a standardized methodology to ensure consistency and reliability across all data collection (19). This study involved Czech adolescents aged 10.5 and 16.49 years from multiple survey waves between 2002 and 2022. Data were drawn from the representative national samples, with participants selected by a cluster sampling approach in accordance with HBSC survey protocols (19). The demographic structure of the samples and the core measures analysed were comparable across survey waves, ensuring reliability of trend analyses (19). The data were collected during the spring months of each survey year, using a self-completed questionnaire distributed in the classroom to students in 5th, 7th and 9th grades. Surveys were conducted using paper-and-pencil interviewing (PAPI) in 2002, 2006, 2010, and 2014, and computer assisted web interviewing (CAWI) in 2018 and 2022. Potential differences between these modes were assessed to ensure comparability of results across survey waves. Participants' parents/guardians were notified about the study through the school and given the option to exclude their children from participation. The institutional Ethics Committee for Research of the Faculty of Physical Culture of Palacký University Olomouc approved the research protocol. The pupil response rate varied among survey waves but consistently exceeded 80%.

Measures

Weight Status Assessment

Weight status was determined by using participants' self-reported height and weight, obtained from questions: "How much do you weigh without clothes?" and "How tall are you without shoes?" Body mass index (BMI) was then calculated by dividing body weight (kg) by the square of body height (m^2). According to the 2007 WHO growth reference chart for age, participants were categorized into three groups: non-overweight (normal/underweight) with BMI < 85th percentile, overweight with BMI 85th–95th percentile, and obese with BMI > 97th percentile (20). WHO growth references were used in accordance with the HBSC protocol to ensure comparability across countries. Self-reported height and weight in adolescents is considered a reliable tool to assess WS in large surveys when direct measurement is not possible (21, 22). A total of 3,974 children (6.6%) were excluded from the analysis due to missing or unrealistic data on body height or weight, with the missing rate not exceeding 10% in any survey year.

Body Image and Weight Perception

Adolescents' body image was assessed with the question: "Do you think your body is …?" Possible responses "much too thin", "a bit too thin", "about the right size", "a bit too fat", and "much too fat" were divided into three groups: much/a bit too thin, about right, much/a bit too fat. The HBSC question on body size perception demonstrated strong convergent, divergent and concurrent validity, confirming its reliability as a measure of body image assessment (23). Three groups of body image were compared to their actual WS (non-overweight, overweight, obese). Based on this comparison, body weight perception was classified into three categories: correct weight perception (perceived WS = actual WS), underestimation (perceived WS < actual WS), and overestimation (perceived WS > actual WS) of WS.

Socioeconomic Status Measure

The HBSC Family Affluence Scale (FAS), a validated measure of family income and material wealth (24), was used to assess SES of participants' families. The FAS was calculated by summing responses of 4 (2002–2010)/6 (2014–2022) questions about household assets and material conditions. Between 2002 and 2010, the FAS was based on four items, with responses as follows: car ownership (no = 0, one = 1, two or more = 2), having own bedroom (no = 0, yes = 1), computer ownership (none = 0, one = 1, two = 2, three or more = 3), and family holidays in the past year (never = 0, once = 1, twice = 2, three or more times = 3). In later surveys (2014–2022), the third FAS version was expanded to six items to reflect changes in global living standards by adding two new questions: dishwasher ownership (no = 0, yes = 1) and the number of bathrooms (none = 0, one = 1, two = 2, three or more = 3). A total FAS score was calculated by summing the responses to all items. Then the total score was converted into fractional rank scores, which were used to classify adolescents' families into SES categories: low (lowest 20%), medium (middle 60%), and high (top 20%).

Statistical Analysis

All statistical analyses were conducted using the Statistical Package for the Social Sciences (SPSS) for Windows V.26 (IBM Corp, Armonk, NY, USA). Descriptive statistics were used to calculate the percentage of prevalence of WS (non-overweight, overweight, obese), perceived body image (much/a bit too thin, about right, much/a bit too fat), and body weight perception (correct weight perception, underestimation and overestimation of WS) across six survey years (2002, 2006, 2010, 2014, 2018,

2022). To assess significant changes in each variable (categories of WS, body image, and body weight perception including correct vs. misperception categories) over time (2002–2022), the difference test between two proportions was used. This test was applied separately for boys and girls, as well as across different SES groups, to determine whether the observed changes in the proportion of each category were statistically significant. A p-value of less than 0.001 was considered statistically significant. Logistic regression analysis (enter method) was used to examine the odds of being overweight/obese, underestimating and overestimating WS in relation to gender, age and SES. The survey year variable was included in the models, with 2022 set as the reference category. Odds ratios (OR) with 95% confidence intervals (CI) were calculated, as they represent the most appropriate measure of the trends of change across survey years. The alpha significance level was set to a minimum of 0.001.

RESULTS

A total of 52,363 adolescents were included in the analysis, comprising 26,231 (49.9%) girls and 26,132 (50.1%) boys. The number of participants in each survey wave was 4,985 (2002), 4,718 (2006), 4,249 (2010), 13,216 (2014), 12,403 (2018), and 12,792 (2022). From 2014 onwards, the HBSC study in Czechia increased its sample size to improve national representativeness and ensure reliable trend analyses across age, gender, and socioeconomic groups. The total number of adolescents for each gender and SES category across years, as well as the proportion of adolescents' WS and body weight perception for each survey year, are presented in Tables 1 and 2.

Trends in Weight Status and Perceived Body Weight over Six Survey Years

The prevalence of non-overweight adolescents significantly ($p < 0.001$) decreased across gender and FAS subgroups between 2002 and 2022, while the rates of overweight and obesity increased ($p < 0.001$) (Table 1). A greater overall increase was observed in boys than in girls (overweight/obesity +3.6/5.5 percentage points (pp) for boys, +5.2/2.1 pp for girls) and in the low FAS group compared to middle and high FAS groups (overweight/obesity +5.1/5.3 pp in low FAS, +4.4/3.7 pp in middle FAS, +3.7/2.5 pp in high FAS).

Over the study period, significant ($p < 0.001$) changes in body image perception suggest a growing concern about being underweight among both boys (+7.6 pp) and girls (+6.4 pp) across all FAS groups, alongside a decline in the perception of having an ideal body weight among boys (−11.6 pp) and middle/high FAS group (Table 1). Additionally, while the proportion of boys who considered their body weight to be "much/a bit too fat" increased (+3.7 pp), fewer girls reported feeling "too fat" (−7.6 pp).

Weight Perception Trends by Survey Year: Accuracy and Misperception

Significant ($p < 0.001$) changes in weight perception among both boys and girls were observed over the 20-year period, particularly with a shift in weight underestimation (boys: +8.3 pp; girls: +8.5 pp) and overestimation trends (boys: −2.9 pp; girls: −12.0 pp) (Table 2). When stratified by family affluence, a significant ($p < 0.001$) change in both underestimating (an increase by 9.7/9.0/9.6 pp in low/middle/high FAS, respectively) and overestimating (a decrease by 8.5/8.3/7.0 in low/middle/high FAS, respectively) WS was observed across all FAS groups between 2002 and 2022, while no significant difference occurred among adolescents with correct weigh perception.

Likelihood of Overweight/Obesity and Weight Misclassification

The results highlight a trend of increasing odds of being overweight/obese ($p < 0.001$) over the years, with girls, older adolescents and those from high- and middle-income families showing lower odds ($p < 0.001$) (Table 3). The odds of previous survey years (except 2018) indicate that underestimation of WS was most common in 2022. Additionally, girls and 13-year-olds were less likely to underestimate their WS compared to boys and 11-year-olds. In contrast, the likelihood of overestimating WS decreased ($p < 0.001$) over time, with girls ($p < 0.001$) and older adolescents ($p < 0.001$) having higher odds. Odds of underestimating and overestimating WS among FAS groups were not significant.

DISCUSSION

This study provided new insight into the 20-year trends in adolescent WS and body weight perception among Czech youth, stratified by gender, age and SES. The results showed a marked increase in overweight and obesity prevalence between 2002 and 2022: from 16.3% to 19.9% in boys, and from 7.7% to 12.9% in girls (for overweight); and from 3.0% to 8.5% in boys, and from 1.3% to 3.4% in girls (for obesity). These increases were most pronounced in boys and adolescents from low SES families, underlining persistent social inequalities. Comparing trends in WS across studies is challenging due to variations in weight assessment methods (19, 20), time frames, age group classifications (6–8), and whether studies are cross-national (6–8) or country specific (25–27), with some examining obesity and overweight separately (6, 8) and others combining them (7). Consistent with our findings, an increase in overweight prevalence was observed in both genders between 2002 and 2010 in 10 out of 25 countries including for example Croatia, Estonia, Latvia, Poland, and Slovenia (6). However, despite this rise, prevalence levels in these countries generally remained lower than those noted in many Western European countries (6). Similarly, an increase in WS was observed in adolescents from 16 out of 27 mostly European countries (obesity, 2002–2014) (8), as well as in Belgium (overweight, 1997–2018), the Baltic countries (obesity, 2006–2018), and Denmark (overweight and obesity, 1999–2018), particularly among individuals with low SES, highlighting the impact of social inequality (25–27). On the other hand, a systematic review and meta-analysis found no substantial change in the prevalence of combined overweight and obesity in European children aged 2 to 13 years, which increased only slightly from 20.6% (95% CI: 18.8%–22.4%) during the 1999–2006 period to

Table 1. *Changes in proportions (%) of weight status and body image perception by gender and socioeconomic status across six survey waves*

	Survey year	2002	2006	2010	2014	2018	2022	2002 vs. 2022 p-value
Boys	n	2,396	2,382	2,070	6,572	6,267	6,545	
	Non-overweight (%)[a]	80.7	76.3	72.9	73.5	72.6	71.6	< 0.001
	Overweight (%)[b]	16.3	17.1	21.1	20.1	19.9	19.9	< 0.001
	Obesity (%)[c]	3.0	6.6	6.0	6.4	7.5	8.5	< 0.001
Girls	n	2,589	2,336	2,179	6,644	6,136	6,247	
	Non-overweight (%)[a]	91.0	82.3	87.2	86.3	84.5	83.7	< 0.001
	Overweight (%)[b]	7.7	13.9	10.8	11.1	12.7	12.9	< 0.001
	Obesity (%)[c]	1.3	3.8	2.0	2.6	2.7	3.4	< 0.001
Low FAS	n	876	559	621	1,769	1,726	2,694	
	Non-overweight (%)[a]	83.4	80.3	81.3	77.7	73.5	73.0	< 0.001
	Overweight (%)[b]	13.5	14.5	14.5	16.0	18.5	18.6	< 0.001
	Obesity (%)[c]	3.1	5.2	4.2	6.3	8.0	8.4	< 0.001
Middle FAS	n	2,993	3,296	2,867	7,748	8,426	7,690	
	Non-overweight (%)[a]	85.9	78.9	80.0	79.3	78.5	77.8	< 0.001
	Overweight (%)[b]	12.1	15.6	15.8	16.4	16.5	16.5	< 0.001
	Obesity (%)[c]	2.0	5.5	4.2	4.3	5.0	5.7	< 0.001
High FAS	n	1,039	768	619	3,311	1,987	2,170	
	Non-overweight (%)[a]	88.6	81.1	80.6	82.9	83.1	82.4	< 0.001
	Overweight (%)[b]	9.9	15.1	16.8	13.2	13.9	13.6	< 0.001
	Obesity (%)[c]	1.5	3.8	2.6	3.9	3.0	4.0	< 0.001
Body imaged								
Boys	n	2,387	2,370	2,064	6,542	6,146	6,536	
	Much/a bit too thin (%)[d]	19.4	23.1	21.0	22.4	26.3	27.0	< 0.001
	About right (%)[d]	61.3	55.8	54.7	54.4	51.5	49.7	< 0.001
	Much/a bit too fat (%)[d]	19.4	21.1	24.3	23.2	22.2	23.3	< 0.001
Girls	n	2,583	2,330	2,174	6,612	6,081	6,242	
	Much/a bit too thin (%)[d]	15.1	15.8	16.4	19.0	22.0	21.5	< 0.001
	About right (%)[d]	51.3	48.6	51.0	49.5	51.1	52.5	0.305
	Much/a bit too fat (%)[d]	33.6	35.6	32.7	31.4	27.0	26.0	< 0.001
Low FAS	n	871	555	619	1,763	1,700	2,692	
	Much/a bit too thin (%)[d]	15.2	22.3	18.4	20.5	21.4	22.4	< 0.001
	About right (%)[d]	52.9	48.1	52.3	50.8	48.6	48.6	0.027
	Much/a bit too fat (%)[d]	31.9	29.6	29.3	28.7	30.0	30.0	0.290
Middle FAS	n	2,987	3,286	2,861	7,706	8,318	7,683	
	Much/a bit too thin (%)[d]	17.2	19.0	18.9	20.3	24.2	24.3	< 0.001
	About right (%)[d]	55.6	51.9	52.3	51.8	51.4	51.6	< 0.001
	Much/a bit too fat (%)[d]	27.2	29.1	28.8	27.9	24.4	24.2	0.002
High FAS	n	1,035	765	617	3,296	1,949	2,167	
	Much/a bit too thin (%)[d]	18.4	20.0	17.2	21.8	26.5	27.0	< 0.001
	About right (%)[d]	59.4	55.9	56.1	52.6	53.3	52.6	< 0.001
	Much/a bit too fat (%)[d]	22.2	24.1	26.7	25.6	20.1	20.4	0.242

FAS – family affluence status; [a] – body mass index (BMI) < 85th percentile; [b] – BMI 85th–95th percentile; [c] – BMI > 97th percentile; [d] – perceived weight status based on the question "Do you think your body is?"; p – statistical significance based on difference test between two proportions

Table 2. *Changes in body weight perception (correct and misperception) among boys and girls and across family affluence groups (2002 vs. 2022)*

	Survey year	2002	2006	2010	2014	2018	2022	2002 vs. 2022 p-value
Boys	n	2,387	2,370	2,064	6,542	6,146	6,536	
	Underestimation (%)[a]	25.1	31.1	29.7	30.0	34.4	34.4	< 0.001
	Correct (%)[b]	64.5	61.0	60.5	60.9	58.1	58.1	< 0.001
	Overestimation (%)[c]	10.3	7.9	9.8	9.1	7.6	7.4	< 0.001
Girls	n	2,583	2,330	2,174	6,612	6,081	6,242	
	Underestimation (%)[a]	14.7	18.7	17.2	19.1	23.3	23.2	< 0.001
	Correct (%)[b]	57.2	58.3	58.7	58.5	59.3	60.8	0.002
	Overestimation (%)[c]	28.1	23.0	24.1	22.4	17.4	16.1	< 0.001
Low FAS	n	871	555	619	1,763	1,700	2,692	
	Underestimation (%)[a]	17.7	27.6	23.4	24.6	27.2	27.3	< 0.001
	Correct (%)[b]	60.7	54.1	57.7	60.4	59.7	59.6	0.565
	Overestimation (%)[c]	21.6	18.4	18.9	15.0	13.1	13.1	< 0.001
Middle FAS	n	2,987	3,286	2,861	7,706	8,318	7,683	
	Underestimation (%)[a]	20.1	23.9	23.4	24.5	28.9	29.1	< 0.001
	Correct (%)[b]	60.1	60.7	59.7	59.7	58.8	59.3	0.450
	Overestimation (%)[c]	19.8	15.4	17.0	15.8	12.3	11.5	< 0.001
High FAS	n	1,035	765	617	3,296	1,949	2,167	
	Underestimation (%)[a]	20.2	27.1	22.7	24.3	30.7	29.8	< 0.001
	Correct (%)[b]	62.2	59.2	60.9	59.5	57.0	59.5	0.144
	Overestimation (%)[c]	17.6	13.7	16.4	16.2	12.3	10.6	< 0.001

FAS – family affluence status; [a] – adolescents with a perceived lower weight than actual weight; [b] – adolescents with correct perceived weight; [c] – adolescents with a perceived higher weight than actual weight; p – statistical significance based on difference test between two proportions

Table 3. *Odds ratios for being overweight/obese, underestimating and overestimating weight status by survey year, age category, gender, and family affluence*

		Model 1 Overweight/obese		Model 2 Underestimated WS		Model 3 Overestimated WS	
		OR	95% CI	OR	95% CI	OR	95% CI
Survey year	2022	Ref.		Ref.		Ref.	
	2018	0.96	0.90–1.02	1.01	0.95–1.06	1.06	0.99–1.15
	2014	0.90***	0.84–0.95	0.80***	0.75–0.84	1.43***	1.33–1.54
	2010	0.87***	0.80–0.95	0.75***	0.69–0.82	1.55***	1.40–1.71
	2006	0.92*	0.84–0.99	0.81***	0.75–0.88	1.39***	1.26–1.53
	2002	0.58***	0.53–0.63	0.61***	0.56–0.66	1.83***	1.67–2.01
Gender	Boys	Ref.		Ref.		Ref.	
	Girls	0.47***	0.45–0.49	0.55***	0.53–0.58	2.82***	2.68–2.98
Age category/grade	11y/5th	Ref.		Ref.		Ref.	
	13y/7th	0.90***	0.85–0.94	0.91***	0.86–0.95	1.30***	1.22–1.38
	15y/9th	0.75***	0.71–0.80	0.96	0.91–1.01	1.26***	1.18–1.35
FAS	Low	Ref.		Ref.		Ref.	
	Middle	0.82***	0.77–0.86	1.02	0.97–1.08	0.95	0.89–1.02
	High	0.63***	0.58–0.68	1.05	0.98–1.12	0.94	0.86–1.02

Logistic regression analysis, enter method: OR – odds ratio (represents the likelihood of being overweight/obese, underestimating and overestimating weight status in relation to the reference group); CI – confidence interval; Ref. – reference group; FAS – family affluence status; *p < 0.05; **p < 0.01; ***p < 0.001; WS – weight status

21.3% (95% CI: 19.2%–23.6%) during 2011–2016 period (7). The steeper rise observed in Czech adolescents over the last 20 years suggests limited effectiveness of national public health strategies, emphasizing the need for more targeted age and gender-sensitive interventions, particularly for low SES families.

This study found a significant reduction in the tendency to overestimate weight and a rise in underestimation in both genders, with girls and older adolescents more likely to overestimate and boys and 11-year-olds more likely to underestimate their weight, while correct weight perception increased (slightly though) in girls but declined in boys over the 20-year period. These findings were consistent with time trends in weight perception between 2002 and 2018 among 1,030,627 adolescents from 41 mostly European countries and regions, with notable country differences in trends in body weight perception (18). An improvement in correctly perceiving one's body and a decrease in overestimation over time may lead to higher life satisfaction, better mental health, increased self-esteem, healthier behaviours, and a reduced risk of developing eating disorders (14, 16). On the other hand, a growing tendency to underestimate weight may indicate an increased risk of overlooking weight-related health issues (17). This shift toward a lower perceived weight than actual weight might be influenced by changes in societal norms and ideals (23). In recent years, the body-positivity movement has emerged and grown substantially on social media (e.g., Instagram, TikTok), emphasizing the acceptance of diverse physical appearances and promoting content related to improving body image and self-esteem (17, 28). For example, viewing advertisements with plus-size models was associated with greater improvements in body satisfaction (17). According to a content analysis of Instagram images, young white females contributed to the majority of body-positive posts, which could explain the gender differences in overestimation trends found in this study (10.3%–7.4% for boys, 28.1%–16.1% for girls) (17). Despite the benefits of reducing trends in the overestimation of body weight, it could potentially lead to negative weight-health outcomes (especially obesity) (17). Therefore, these trends and their potential long-term effects should be closely monitored.

Strengths and Limitations

This study offers several strengths, which include a large, nationally representative sample of Czech children aged 11–15 years and data from six survey waves tracking trends in WS and body weight perception over 20 years, allowing robust trend analysis. The study also has some limitations, including reliance on self-reported data, which may underestimate BMI (21) and be biased by social desirability or inaccuracies; a cross-sectional design limiting causal relationships; failure to account for other factors, such as ethnic variations or self-esteem; and the gradual increase in sample size across survey years, which could affect comparability, although this was minimized by applying weighting and standardised analytical procedures. In addition, the reduced attention to underweight participants due to combining the underweight and normal weight categories into a single non-overweight group should be acknowledged. Future research should examine trends and body weight perception specifically in the underweight group, as underweight status may influence rates of underestimation and overestimation of WS.

CONCLUSIONS

This study observed a significant rise in overweight and obesity across gender and SES groups, with a greater increase among boys and lower SES backgrounds, alongside a decline in the proportion of non-overweight adolescents between 2002 and 2022. Over time, perceived body image changes included an increase in feeling "too thin" (both genders, all SES groups), a decrease in feeling "about right" (boys, middle and high SES), and a shift in feeling "too fat" (a decrease in boys, an increase in girls). The findings also suggested a 3.6% improvement in correct weight perception (girls), as well as a decrease in overestimation of WS (both genders, but especially among girls) over the 20-year period, which may encourage healthier behaviours in youth. In contrast, the growing tendency to underestimate WS may hinder recognition of overweight and obesity, increasing the risk of neglecting weight-related health issues. These findings emphasize the importance of continued surveillance of weight trends and body image perceptions, particularly in vulnerable groups. In line with WHO recommendations, future public health strategies should integrate physical and mental health promotion, target early adolescence to foster healthy behaviours and body image literacy and address social inequalities.

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Authors' Contributions

MK – methodology, data collection, analysis; JV – original draft. All authors contributed equally to the study concept and read and approved the final version of the manuscript.

Conflicts of Interest

None declared

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