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Obesity and overweight among school children - parent's perception versus reality

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Abstract

Childhood obesity has become a severe health problem for developing countries. Carrying out periodic screenings to identify the prevalence of obesity in a region is essential for assuring the effectiveness and efficiency of the measures adopted for preventing and combating obesity. *Aim:* Therefore, the purpose of this study was to evaluate the level of obesity of children from Timișoara, Romania, enrolled from preparatory one to fourth grade (6-11 years) as well as to assess the parent's perception of their own weight and the weight of their children. *Material and methods:* The present study was carried out over a period of 3 months (December 2021- February 2022), comprising a representative sample. The total number of the subjects was 385, who were children enrolled in preparatory-four classes/primary education (6-11 years; 184 girls 8.56±1.42 years; 201 boys 8.43±1.58 years) and their parents (334 mothers 38.88±4.57 years; 51 fathers 41.47±4.88 years). The research protocol consisted of applying a questionnaire and taking anthropometric measurements. *Results:* More than 31% of the studied children exceed the normal weight, with a percentage of 15.1% overweight and 16.1% obese. In our study there is a significant difference ($\chi^2=81.16$; $d=3$; $p<0.0001$) between the actual child's Body mass index classification and the body images chosen by the parents from the Children's Body Image Scale (CBIS). Thus, out of 120 overweight or obese cases, only 25 participants were correctly perceived. Therefore, we can state that only 20.8% of parents whose children exceed the normal weight chose a body image suitable for the child's actual weight status, therefore, perceived their children's body weight correctly. *Conclusions:* Summarizing the data within this study, we can conclude that one out of three primary school children in Timișoara is overweight or obese and many parents misperceived their children's weight status.

Key words: Childhood obesity, Overweight, Body Image Scale, Body Perception

Rezumat

Obezitatea infantilă a devenit o problemă gravă de sănătate pentru țările în curs de dezvoltare. Efectuarea periodică de screening-uri pentru identificarea prevalenței obezității este esențială pentru asigurarea eficienței măsurilor adoptate pentru prevenirea și combaterea obezității. Scopul acestui studiu a fost acela de a evalua nivelul de obezitate al copiilor din Timișoara, România, înscriși în clasele pregătitoare până la clasele a IV-a (6-11 ani), precum și de a evalua percepția părinților asupra propriei greutate și a greutății propriilor copii. *Material și metode:* Prezentul studiu a fost realizat pe o perioadă de 3 luni (decembrie 2021 – februarie 2022), cuprinzând un eșantion reprezentativ. Numărul total al subiecților a fost de 385, copii înscriși în clasele pregătitoare-patru/învățământ primar (6-11 ani; 184 fete 8,56±1,42 ani; 201 băieți 8,43±1,58 ani) și părinții acestora (334 mame cu vârsta 38,88±4,57 ani; 51 tați cu vârsta 41,47±4,88 ani). Protocolul de cercetare a constat în aplicarea unui chestionar și efectuarea unor măsurători antropometrice. *Rezultate:* Peste 31% dintre copiii studiați depășesc greutatea normală, cu un procent de 15,1% supraponderali și 16,1% obezi. În studiul nostru este o diferență semnificativă ($\chi^2=81,16$; $d=3$; $p<0,0001$) între clasificarea Indicele de masa corporală real a copilului și imaginile corporale alese de părinți din Scala de imagine corporală a copiilor (CBIS). Astfel, din 120 de cazuri de copii supraponderali sau obezi, doar 25 de participanți au fost percepuți corect. Prin urmare, putem afirma că doar 20,8% dintre părinții ai căror copii depășesc greutatea normală au ales o

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imagine corporală potrivită greutatei reale a copilului. *Concluzii:* Rezumând datele din acest studiu, putem concluziona că unul din trei copii de școală primară din Timișoara este supraponderal sau obez și mai mult de 3 sferturi dintre părinți au perceput greșit greutatea propriilor copii subestimându-le greutatea reală.

Cuvinte cheie: *Obezitate infantilă, supraponderalitate, scala imaginii corporale, percepția corpului*

Introduction

Childhood obesity has become a severe health problem for developing countries. The easy access to various types of foods, and adopting not only a sedentary behavior but also an eating style specific to the urbanized population led to a gradual increase in the prevalence of obesity in Romania as well (Mocanu, 2013; Uliaszek & Koziel, 2007). A high prevalence of obesity is a medical challenge, attracting high costs for diagnosis and treatment. It is known that the onset of obesity increases the risk of developing severe conditions, such as coronary heart disease, ischemic stroke, and type 2 diabetes mellitus, and even developing different types of cancer, such as breast, pancreatic, or colon cancer (Roman et al., 2015; WHO, 2002). Moreover, the risk of developing one of the conditions mentioned above increases highly when obesity is diagnosed in childhood and maintained throughout adulthood (Engeland et al., 2004; Freedman et al., 1999). In countries with a high rate of obesity, not only the medical system is to be affected, but also the social system will be challenged due to the fact that obesity is considered a disability, ending up with the patient reaching the inability to participate in everyday activities (WHO, 2002). Complications also occur psychologically, especially for obese children, who report a lower quality of life characterized by a lack of self-confidence and isolation from their environment (Barbu et al., 2015; Ottova et al., 2012). Thus, to combat these effects, it is essential to prevent obesity from the earliest age. Unfortunately, this does not always happen, as seen in Romania, a country with a high prevalence of obesity among children. This trend has been highlighted over time through a series of studies carried out in several regions of the country (Chirita-Emandi et al., 2016). To obtain a general view regarding childhood obesity prevalence at the national level, Chirita-Emandi et al. (2016) made a synthesis of several studies carried out at the local level. Data obtained revealed that during the period 2006-2015, approximately one in four children was overweight or obese. The same trend was observed in 2019, as shown in a study of The National Institute of Public Health of Romania on a sample of 10393 children (7-9 years), of which 16.6% were overweight and 13.9% obese. The increase in the prevalence of childhood obesity is due

to multiple causes representing complex interactions between genetic, physiological, psychological, economic, environmental, political, and social aspects (Wright & Aronne, 2012). Although obesity in children can be diagnosed relatively quickly by anyone, based on the ratio of body weight to the square of height interpreted with the help of nomograms (Dietz, 1988), this medical problem is ignored in many cases for various reasons. The parent's misperception of their children's body weight is one of the main reasons. In most cases, the parents underestimate their children's weight; therefore, they will not ask for help in treating this condition (De La O et al., 2009; Duncan et al., 2015; Strava, 2017)

Carrying out periodic screenings to identify the prevalence of obesity in a region is essential for assuring the effectiveness and efficiency of the measures adopted for preventing and combating obesity. Therefore, the purpose of this study was to evaluate the level of obesity of children from Timișoara, Romania, enrolled from preparatory one to fourth grade (6-11 years) as well as to assess the parent's perception of their own weight and the weight of their children.

Materials and methods

The present study was carried out over a period of 3 months (December 2021 - February 2022), comprising a representative sample (Confidence Level 95%; Margin of Error ± 5). The total number of the subjects was 385, who were children enrolled in preparatory-four classes/primary education (6-11 years; 184 girls 8.56 ± 1.42 years; 201 boys 8.43 ± 1.58 years) and their parents (334 mothers 38.88 ± 4.57 years; 51 fathers 41.47 ± 4.88 years). The sample was calculated from a total number of 12883 students enrolled in mass education system from Timișoara, at the primary level.

The research protocol consisted of applying a questionnaire and taking anthropometric measurements of the participants. The questionnaire used consisted in two parts. The first part included a set of eight questions aiming to obtain the following information: age and gender of children and parents, the weight category to which the parent considers both he and his child belong to,

the school were the child studies and parents degree of concern regarding the child's body weight by completing a scale with values from 1 to 7 where 1 means not at all and 7 means very much.

The second part of the questionnaire consisted of The Children's Body Image Scale (CBIS) (Truby & Paxton, 2002). This scale contains seven images illustrating various body shapes of a boy and a girl (8-12 years old), starting from thin and ending with obese size. Each body shape corresponds to one of the 7 percentiles classified by the CDC (Kuczmarski, 2002). At this point, each parent had to answer two questions: the first one was "Which of the following illustrations represents a body image similar to your child's?" and the second one was: "Which of the

following illustrations do you think represents an ideal body image for your child?".

After completing the questionnaire, each one of the respondents was contacted and scheduled for anthropometric measurements.

The children's weight was measured using a portable stadiometer (Seca model 213, Germany) with a precision of 1 mm. Their body weight was evaluated using the Tanita BC 601 system, with an accuracy of 0,1 kg. During the measurements, each subject wore light clothes, e.g., undershirt and shorts. Furthermore, the subjects were asked not to eat or drink for at least two hours before the body weight evaluation.

Results

All data obtained in this study were summarized in several tables and were statistically analyzed using GraphPad Prism 6 software.

Table 1 shows the prevalence of obesity for the subjects of this study, which was determined based on Body mass index (BMI) obtained after the anthropometric measurements.

Table 1. Classification of subject in weight categories based on BMI

Weight status	Children			Parents		
	Girls	Boys	Total	Mothers	Fathers	Total
Underweight	22 (11.95%)					
Normal weight	120 (65.21%)	104 (51.74%)	224 (58.18%)	202 (60.47%)	15 (29.41%)	217 (56.36%)
Overweight	20 (10.86%)	38 (18.9%)	58 (15.06%)	77 (23.05%)	23 (45.09%)	100 (25.97%)
Obese	22 (11.95%)	40 (19.9%)	62 (16.1%)	36 (10.77%)	13 (25.49%)	49 (12.72%)
19 (9.45%)			41 (10.64%)	19 (5.68%)	0 (0%)	19 (4.93%)

Based on the data set presented in Table 1, more than 31% of the studied children exceed the normal weight, with a percentage of 15.1% overweight and 16.1% obese.

When analyzing the data according to gender, boys have a higher prevalence of obesity and overweight (38.8%) than girls (22.8%).

Among parents, the prevalence of obesity and overweight is 38.69% (25.97% overweight; 12.72% obese).

Table 2 shows the classification of children within the seven percentile, based on their real BMI, and using the reference values given by CDC (Kuczmarski, 2002), as well as children's classification based on BMI perceived by their parents.

Table 2. BMI percentile classification based on actual BMI and BMI perceived by parents based on CBIS by the parents

Percentiles	Actual BMI	Perceived BMI*	Ideal BMI*
5 th <	41 (10.64%)	71 (18.44%)	0
5-9.99 th	15 (3.89%)	0	43 (11.16%)
10-24.99 th	35 (9.09%)	89 (23.11%)	141 (36.62%)
25-49.99 th	66 (17.14%)	99 (25.71%)	154 (40%)
50-74.99 th	66 (17.14%)	58 (15.06%)	36 (9.35%)
75-84.99 th	42 (10.9%)	43 (11.16%)	6 (1.55%)

85-94.99 th	58 (15.06%)	18 (4.67%)	2 (0.51%)
>95 th	62 (16.1%)	7 (1.81%)	3 (0.77%)

*the record represent the parents' choice of the illustrations from the Children's Body Image Scale (CBIS) (Truby & Paxton, 2002)

We summarize in Table 3 the responses given by the parents regarding perception over their children's weight, which were classified in four weight categories. In addition to the answers received on the CBIS scale, the answers given by the parents to

the question "How do they rate their child according to body weight?" are also presented. To this question, they had at their disposal four weight categories as text responses (underweight, normal weight, overweight and obese).

Table 3. Weight category classification based on actual, perceived and ideal BMI

Weight status	Actual BMI	Perceived BMI(CBIS)*	Ideal BMI*	Perceived BMI(txt)**
Underweight	41 (10.64%)	71 (18.44%)	0 (0%)	31 (8.05%)
Normal weight	224 (58.18%)	289 (75.06%)	380 (98.70%)	290 (75.32%)
Overweight	58 (15.06%)	18 (4.67%)	2 (0.51%)	61 (15.84%)
Obese	62 (16.1%)	7 (1.81%)	3 (0.77%)	3 (0.77%)

* the responses registered represent the parents' choice of the illustrations from the Children's Body Image Scale (CBIS) (Truby & Paxton, 2002)

**text responses regarding the four weight categories

As shown in Table 3, there is a significant difference ($\chi^2=81.16$; $d=3$; $p<0.0001$) between the actual child's BMI classification and the body images chosen by the parents from the Children's Body Image Scale (CBIS). Thus, out of 120 overweight or obese children, only 25 were correctly perceived. Therefore, we can state that only 20.83% of parents whose children exceed the normal weight chose a body image suitable for the child's actual weight status, therefore, perceived their children's body weight correctly. On the other hand, in a percentage of 79.17%, the other parents underestimated their children's weight, choosing a more slender figure. Perception errors were also observed in the underweight category, where 7.79% more cases of underweight are perceived than actually exist. Thus, we identify the same underestimation of the actual body weight.

Significant differences in perception ($\chi^2=63.49$; $d=3$; $p<0.0001$) are also found when comparing the actual BMI with the text responses the parents chose. The responses to the question "How do you rate your child, depending on his weight?", only 64 (53.33%) of the parents correctly chose the overweight or the obese weight category regarding their children, when 120 children were overweight or obese. Therefore, based on the data presented in this study,

we observe a significant misperception between the actual BMI and the silhouettes chosen by the parents to represent their children's body weight.

Considering that 98.7% of parents opted for an ideal figure that is part of the normal weight category, we can say that these errors are not caused by a lack of an image of what a healthy figure should look like but rather, by a lack of objectivity. They can identify a silhouette from the normal weight category. Still, when it comes to their children, even though they are overweight or obese, the parents will not associate their children with a silhouette that is part of the same weight category, choosing in exchange another shape from a lower weight category. The parents' lack of objectivity or simply ignoring their children's body weight can be one of the factors favoring the appearance and development of childhood obesity. In this study, we demonstrate this statistically, based on the relation between a child's BMI and the parent's perception. There is, therefore, a reasonable, positive correlation ($r = 0.55$, $p < 0.0001$) between the child's BMI and the perceived deviation from the actual value. These results indicate that the further the parent's perception is from reality, the higher the child's BMI.

Discussions

The results obtained in this study indicate a prevalence of overweight of 31.16% (15.1% overweight, 16.1% obesity) for school children

enrolled in primary education level in Timisoara, Romania. In other words, one in three children exceeds the normal weight for their age and height. Furthermore, analyzing the literature data from the last ten years, we notice that our results are similar to those registered nationally.

Since 2013, Romania has participated in the European Childhood Obesity Surveillance Initiative (COSI), coordinated by the WHO. Thus, after the 3rd phase of this project, carried out between April and May 2013, the prevalence of overweight among 8-year-old school children in Romania was 25.5% (14% overweight, 14% Obesity for boys; 15% overweight, eight obesity for girls) (WHO, 2018). By the 4th phase, carried out in March-June 2016, the prevalence of overweight for the same age category was 28.5% (16% overweight, 15% obesity for boys; 17% overweight, 9% obesity for girls) (WHO, 2021). In May-June 2019, the prevalence of overweight in 8-year-old children increased even more, reaching 31.4% (15.9 overweight, 17.7 obesity for boys; 17.7 overweight, 11.7 obesity for girls) (WHO, 2022). In addition to the other reports, the 2019 report includes information for the 7-9 year age range. Therefore, the overweight prevalence for children in this age category was 30.5% (15.8 overweight, 16.4 obesity for boys; 17.4 overweight, 11.3 obesity for girls) (WHO, 2022).

On a European level, according to data provided by the WHO through COSI, in 2019, the prevalence of overweight for the age range 7-9 years was 29% (17% overweight, 12% obesity).

Similar to the findings highlighted in our study, boys had a higher prevalence of overweight than girls (31% boys, 28% girls) (WHO, 2022).

Following the evolution of the last three published phases of the COSI project, we observe an upward trend in Romania regarding the prevalence of overweight. Our results continue the same upward trend; the values we obtained are higher than the values registered in 2019. Nonetheless, our data reveal a situation at a local level. The big perspective for Romania will be obtained in phase VI of COSI, which has a completion and publication deadline of 2023.

Several factors can influence the continued increase in overweight. As concluded in our study, but also based on literature data, parents' perception of their children's body weight has an essential role in determining growth abnormalities; hence, parental

misperception can influence the long-term healthy development of their children (Sae-wong et al., 2020; Strava, 2017).

In our study, only a quarter of the parents correctly estimated their children's body weight. Other authors presented similar results as well. For example, the review by Parry et al. (2008) analyzing a total of 23 studies, in 19 of them, more than half of the parents misperceived body weight tended to underestimate their children's weight status. Although these children are overweight or obese, due to a misperception, their parents are not looking for solutions to combat this serious health problem. Body weight perception can be influenced by age, gender, education, social status, or other variables. Although in our study, there is no difference between mothers and fathers regarding the perception of their children's weight, the study of Adams et al. (2005) highlights the fact that fathers may have a more erroneous perception compared to mothers. Another study by Keller et al. (2013) showed that older parents have greater difficulty in correctly perceiving their children's weight.

The present study provides information regarding the prevalence of obesity and overweight among children in Timișoara, but also on the parent's perception of their children's weight.

Thus, through the research protocol used, the study confirms that there is a real problem represented by the prevalence of obesity in the studied sample and that among the parents surveyed, there is a misperception regarding the weight category of their children. Therefore, this last aspect may be one of the reasons for the delay in adopting by the parents, the effective measures to combat child obesity. Worldwide, there are many similar studies, but there are only a few for Romania regarding childhood obesity. Therefore, one of the strengths of our research is represented by the new data added to the specific literature regarding the prevalence of childhood obesity. However, our study also has certain limitations, such as the lack of a body composition assessment that provides the percentage of body fat, a parameter more accurate for assessing obesity in children. In addition, another limitation of the study may be the fact that other age categories were not addressed, in order to obtain an extensive perspective of the difference between perception and reality.

Conclusions

Summarizing the data within this study, we can conclude that one out of three primary school children in Timișoara is overweight or obese.

Similarly to the data provided by WHO, the situation is more alarming among boys (18.9% overweight, obese 19.9%) than girls (10.86% overweight, 11.95% obese).

Data from our study shows that besides the high percentage of overweight children, we observe many parents that misperceived their children's weight status. For example, three out of four parents whose

children were overweight or obese misperceived their child's body weight, placing them in a lower weight category than the real one.

The current situation, with a high percentage of overweight or obese children, may be favored by a set of factors, and the erroneous perception of body weight represents a very important one. Thus, this misperception represents a great challenge for specialists in implementing programs to prevent and combat obesity because parents who do not have an actual image of their children's weight status are not interested in participating in such programs.

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