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Original article

PARENTAL PERCEPTIONS ON THEIR CHILD'S WEIGHT STATUS IN NORTH MACEDONIA

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Abstract

Introduction: Obesity is a growing crisis, with onset in early childhood. Therefore, understanding the complexity of the family interplay is an important step.

Aim: The purpose of this study was to explore parental perceptions of their child's weight among a nationally representative sample of children living in North Macedonia.

Materials and Methods: From October to December 2022, a cross-sectional study was conducted including children and their parents/caregivers who were living in North Macedonia. The study was a part of the 6th round of the WHO Childhood Obesity Surveillance Initiative (COSI). Parental perceptions were assessed through record forms and compared in relation to objectively measured weight status using anthropometric standardized procedures. WHO 2007 cut-off definitions on overweight/obesity were used. Wald χ^2-tests were used to explore relations between objectively measured weight status (i.e., body mass index - BMI) and parental perceptions of their child's weight status. Statistical significance was set at $p<0.05$ *a priori*.

Results: The sample was composed of 2613 school children with equal male to female representation and majority living in urban areas, whilst 31.8% of the children were living with overweight (including obesity). Parents underestimated their child's weight status, especially regarding children with overweight and obesity.

Conclusion: To the best of our knowledge, this is the first study in North Macedonia to explore parental perceptions of school children's weight status and compare accuracy with objective measured children's weight status. Our study further compliments previous evidence of parental underestimation of children living with overweight and obesity, which is a crucial factor in understanding and addressing childhood obesity.

Keywords: parental perception, childhood obesity, weight status, WHO-COSI

Introduction

Childhood obesity is a growing global crisis. The World Health Organization (WHO) has developed a comprehensive acceleration plan urging for recognition of obesity as a complex chronic disease in need of policy action implementation and delivery of support

services[1]. There is increasing evidence that the burden of childhood overweight (including obesity) more than doubled in the last two decades[2] and every third child in the European Region is living with overweight and/or obesity[3]. Obesity influences children's overall wellbeing and health and is associated with health risks and comorbidities, especially chronic diseases such as cardiovascular, diabetes and cancer[4-6].

Early childhood is a critical time-span for the onset of overweight and/or obesity[7]. Therefore, the environment where children live has a decisive influence since parents and caregivers play pivotal roles in childcare[8]. Parental emotional response to child's needs is a documented factor influencing child's weight status and dietary habits, in particular the child's ability to self-regulate their emotions and appetite control[9]. Moreover, parental depression and stress are correlated with childhood obesity [10,11] and negative adverse experiences in childhood are a strong predictive factor of obesity as well[12]. Assessments of the association between parenting and obesity are among the first research, apart from individual behaviour patterns, embarking on the causality path and coincides with the public opinion on parents perceived role and responsibility for child's weight status[13]. These are leading factors for shaming and stigmatizing parents, while emerging research has found markers such as family-based weight stigma and parental shaming of children as young as three years of age leading to poor health consequences such as negative psychosocial well-being and development of obesity[14,15]. Thus, these intertwined factors demonstrate complexity of the family interplay in risk of childhood obesity.

The evidence of obesity life-span prevention is also addressing the importance of parents' involvement in prevention and effective interventions tackling overweight and/or obesity[16,17]. Therefore, understanding parental perceptions, from unrecognising overweight to family weight stigma and interrelated influences is essential, especially within multicultural contexts. The purpose of this study was to explore parental perceptions of their child's weight in relation to objectively measured weight status (i.e., BMI) using anthropometric standardized procedures among a nationally representative sample of children living in North Macedonia.

Materials and methods

Study Design and Data Collection Procedures

This study used data from the WHO Childhood Obesity Surveillance Initiative (COSI), a unique system implemented in 40 countries across the European Region, including North Macedonia since 2010. The national study protocol and data collection followed WHO standardized procedures and COSI methodology, elsewhere published[18,19].

Participants, school-aged children enrolled in second grade in primary school across North Macedonia were recruited using a two-stage stratified sampling method. Primary schools were defined using a sentinel approach (i.e., same schools are included in each COSI round), initially chosen for ensuring demographic and socioeconomic representation and diversity, and by location of schools based on territories of the 10 Regional Public Health Centres Network across North Macedonia.

Data were collected between October and December 2022. Two COSI forms were administered: (1) mandatory child form completed by the examiner in the school setting where each child's age, sex, birth date, place of residence, level of urbanization and anthropometric measurements were measured, and (2) voluntary family form where data were collected on parental perceptions of their child's nutritional status, as well as other diet and nutrition indicators, time-use activities (physical activity, sedentary behaviours and sleep) and sociodemographic and socioeconomic characteristics. Further details on questions and indicators included in COSI forms are available elsewhere[19].

The COSI protocol is in accordance with the International Ethical Guidelines for Biomedical Research involving human subjects[20]. Furthermore, the Macedonian protocol was approved by the Ss. Cyril and Methodius University - Faculty of Medicine's Ethics Committee (approval: 03-2140/1 from 06.05.2022). Children's mental health well-being was taken in consideration and all anthropometric measurements adhered to principles of confidentially were performed in a private office at each school with each child providing informative consent (apart from the signed informed consent by their parents).

Anthropometric measurements and classification of children's weight status

Trained medical doctors from the Centres for Public Health across the country measured children's body weight and height in accordance to WHO standardized procedures and equipment. Classification of children's weight status was based on the 2007 WHO growth references for children aged 5 to 19 years[21]. WHO overweight and obesity definitions were defined based on BMI-for-age Z-scores of children, categorized as: (1) overweight BMI-for-age value ≥1 Z-score, and (2) obesity as BMI-for-age value ≥2 Z-score. Mirroring the WHO COSI methodology, children who did not have biologically plausible values (BMI-for-age Z-score between –5 and +5 relative to the growth median) were excluded from analysis[22].

Family Perceptions on child's weight status

The family form included the following question: "In your opinion, is your child: (1) underweight, (2) normal weight, (3) a little overweight, or (4) extremely overweight." Accuracy of parents' perceptions of their child's weight status was assessed by comparing them with objectively estimated and classified weight status according to WHO definitions.

Statistical Analysis

Collected data were double reviewed. Firstly, the national COSI team verified entries for completeness and entered for data quality review into the WHO-COSI electronic system. Next, the dataset was verified in a standard mode by the European Regional WHO office with sampling weight estimates provided. Post-stratification weights to adjust for the sampling design, oversampling and non-response were used in the analysis to infer results from the sample to the population.

Descriptive analyses were calculated to depict sociodemographic and anthropometric (BMI-for-age Z-scores) characteristics and parental perceptions of their child's weight status. Wald χ^2-tests were used to explore relations between objectively measured BMI and parental perceptions of their child's weight status. Statistical significance was set at $p<0.05$ *a priori*.

Results

A total of 3200 children were invited to participate in the 6th round of COSI in North Macedonia. The response rate was 86.9% (n=2783) among students present at school on the day when anthropometric measurements were obtained. Of the children completing anthropometric measurements, 2613 (93.9%) also returned the completed family form.

As presented in Table 1, male to female representation was equal in the sample. More than half of the children had normal weight (63.6%), whilst 31.8% were living with overweight and obesity, according to the WHO definitions. Of them, 15.2% were living with different levels of obesity (i.e. BMI/A ≥2 Z-score). The majority of children resided in urban locations throughout North Macedonia.

Table 1. Personal Characteristics of Children with Complete COSI-6 Information (n=2613)

Personal Characteristics of the Study Sample	**%**
Sex	
Boy	50.4%
Girl	49.6%
BMI-for-age Z-scores	
Thinness	4.5%
Normal weight	63.7%
Overweight (including obesity)	31.8%
Residential location	
Urban	66.9%
Rural	33.1%

Notes: BMI-for-age Z-scores: thinness (BMI-for-age value <−2 Z-score), normal weight (BM-for-age value ≥–2 and ≤+1), overweight including obesity (BMI-for-age value ≥1 Z-score).

As highlighted in Table 2, the majority of parents perceived their child as being "normal weight." There was no statistical difference in parents' perceptions of child's weight status between boys and girls.

Table 2. Parental perception of their child's weight

Parental' perception of their child's weight status	**Boys (n=1317)**	**Girls (n=1296)**	***p-value***
Underweight	2.8%	1.8%	
Normal weight	87.6%	85.6%	*.0636*
A little overweight	8.4%	11.8%	
Extremely overweight	1.3%	0.7%	

Parental perceptions, in accordance to WHO classifications of children weight status, for each category for boys and girls are presented in Tables 3, 4, and 5.

Table 3. Parental perceptions of their child's weight among those with normal weight

Parental' perception of their child's weight status	**Boys (n=803)**	**Girls (n= 861)**	***p-value***
Underweight	2.7%	1.6%	
Normal weight	96.2%	94.7%	*.0091*
A little overweight	1.0%	3.2%	
Extremely overweight	0.2%	0.6%	

Table 4. Parental perceptions of their child's weight among children with overweight

Parental' perception of their child's weight status	**Boys (n= 459)**	**Girls (n= 371)**	***p-value***
Underweight	0.8%	1.0%	
Normal weight	73.7%	63.5%	*.0125*
A little overweight	22.1%	34.3 %	
Extremely overweight	3.4%	1.2%	

Table 5. Parental perceptions of their child's weight among children with obesity

Parental' perception of their child's weight status	**Boys (n=229)**	**Girls (n=169)**	***p-value***
Underweight	0.6 %	0.6 %	
Normal weight	54.9 %	33.6 %	*.0003*
A little overweight	37.5 %	63.8 %	
Extremely overweight	6.9 %	2.7 %	

Noteworthy are parents' opinions that 1.2% of boys and 3.8% of girls living with normal weight according to the WHO definitions were perceived as "a little overweight" or "extremely overweight." Normal weight girls were more likely to be considered "a little overweight" or "extremely overweight" by their parent in comparison to boys (Table 3).

Overall, differences were observed in accuracy of parents' perceptions in children living with overweight and/or obesity (Tables 4 and 5). A large proportion of boys (73.7%) and girls (63.5%) living with overweight were perceived by their parents as having "normal weight status." Similarly, 54.9% of boys and 33.6% of girls with obesity were perceived as normal weight by their parents (Table 5).

Discussion

Our findings show that parents living in North Macedonia underestimate their children's weight status, especially regarding children with overweight and/or obesity. This is consistent with a previous study including COSI methodology and countries, especially evident for parents living in Croatia, Portugal, Spain and some Eastern European countries[23]. These results further support the role of cultural contexts, and traditional beliefs that overweight means prosperity, shared between generations in the Region[24], and this body image development might be a determinant of parents' perceptions.

Evidence on parental underestimation of overweight and obesity is extensive. Previous systematic reviews and meta-analysis also report similar findings, particularly among parents of young children[25]. Child gender, parent weight and method of assessment were identified as significant moderators[26,27]. Moreover, a recent study reports that maternal perception on child's weight status is an important variable related to child's BMI z-scores, and maternal feeding practices[28]. Parental perceptions on child's weight status are interrelated to obesity[29]. The children's gender was also identified as a factor for underestimation among parents in our results, and gender-based body norms and culture could be a contributing factor. Parents' perception is the initial step towards childhood obesity awareness, and studies indicate that parents who unrecognised overweight and/or obesity were less concerned about their child's weight, therefore would be less inclined to change health-related behaviours, nor use support services[30,31]. On the other hand, parents who show concerns on child's weight later engage in food-restrictive and monitoring practices[28],[32]. However, parents' perception accuracy for children with normal weight might suggest parental awareness on weight status and intentional omission for other categories in order to not stigmatize their children[33]. Misperception of children with normal weight in our results may be due to weight bias internalization among parents[34].

To the best of our knowledge, this is the first study in North Macedonia to explore parental perceptions of school children weight status and compare accuracy with objective measured children's weight status in a nationally representative sample. However, some limitations should be considered in the interpretation of the results. Firstly, verbal assessment of perceptions and formation of the question on child's weight status in the family record form may have led the parents to response bias. The suggested answer-options were stated, not explained, so parents might unintentionally or intentionally underestimate or really are unaware due to their beliefs and understandings. Furthermore, this study did not analyse differences in perceptions between mothers and fathers, as in the study the majority of family records forms were responded by mothers; therefore, no effect size for comparison between subgroups, between parents or other family members.

The findings of our study are applicable in the design of public health actions and communications messages on children weight status to parents, crucial for consideration in future family-based programmes and interventions on school, community and primary care

level. The national wide network of paediatricians and general practitioners (GPs) is an opportunity to strengthen their communication skills and to address parents' perceptions in routine consultations and measurements, with individual and holistic approaches employed.

Conclusion

The demonstrated unrecognition of childhood obesity among parents living in North Macedonia is a step further in understanding and predicting children's behaviours related to obesity and children's perceptions on their body image and/or body weight. Our findings could have important application in the development of effective preventive interventions in the future. Further research should explore predictive factors influencing parental perceptions of children's weight status among those living in North Macedonia.

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