

Acordo entre o peso corporal, percepção materna e estado de peso em crianças
Agreement between personal and maternal body weight perception and weight status in
children

Acuerdo entre el peso del cuerpo personal y materno estado de percepción y peso en
niños

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Resumo

Antecedentes: As taxas de obesidade continuam aumentando, principalmente entre as crianças. Estudos apontam a subestimação do peso corporal como principal fator para a não adesão aos comportamentos de perda de peso e, em crianças, bem como a subestimação do tamanho do corpo, a percepção percebida pelos pais sobre o peso de seus próprios filhos. é crucial para a manutenção principal do sobrepeso e obesidade. Assim, enfatiza-se que a percepção acurada da imagem corporal de crianças e pais é essencial para combater a alta prevalência de sobrepeso e obesidade na população infantil. **Objetivo:** Avaliar a concordância entre a autopercepção e a percepção materna do peso corporal das crianças e seu status de peso corporal. **Métodos:** Foram avaliadas 935 crianças de 6 a 10 anos e 922 mães. O status do peso corporal foi avaliado por meio de medidas de peso e altura e a percepção da imagem corporal por meio de software para Avaliação da Percepção Corporal Infantil. **Resultados:** Crianças classificadas como "baixo peso" ou "peso normal" demonstraram maior acurácia em suas percepções e tendência à superestimação em meninas cujo status de peso é "normal", enquanto crianças obesas ou com excesso de peso tendem a superestimar seu status de peso. As mães, por outro lado, subestimaram o status de peso dos filhos, independentemente do sexo do filho. **Conclusão:** As crianças apresentaram percepções mais precisas do que as mães em relação ao peso / tamanho corporal.

Palavras-chave: Imagem corporal; Mães; Obesidade pediátrica.

Abstract

Background: Obesity rates continue to rise, particularly among children. Studies point to underestimation of body weight as the main factor for non-adherence to weight loss behaviors and that in children, as well as self-perceived underestimation of body size, the same

perception reported by parents about the weight of their own children is crucial for the maintenance of overweight and obesity. Thus, it is emphasized that accurate perception of body image by both children and parents is essential to combat the high prevalence of overweight and obesity in the child population. Objective: Evaluate the agreement between the self-perception and maternal perception of children's body weight and their body weight status. Methods: In total, 935 children aged 6 to 10 years, and 922 mothers were evaluated. Body weight status was assessed by means of body weight and height measurements and the perception of body image by means of software for Assessing Child Body Perception. Results: Children classified as "low weight" or "normal weight" demonstrated greater accuracy in their perceptions and a tendency to overestimation in girls whose weight status is "normal", while obese or overweight children tended to overestimate their weight status. Mothers, on the other hand, underestimated their children's weight status, regardless of the sex of their child. Conclusion: Children presented more accurate perceptions than mothers regarding their weight / body size.

Keywords: Body image; Mothers; Pediatric obesity.

Resumen

Antecedentes: las tasas de obesidad continúan aumentando, especialmente entre los niños. Los estudios señalan que la subestimación del peso corporal es el factor principal para la falta de adherencia a los comportamientos de pérdida de peso y que en los niños, así como la subestimación autopercebida del tamaño corporal, la misma percepción informada por los padres sobre el peso de sus propios hijos Es crucial para el mantenimiento del sobrepeso y la obesidad. Por lo tanto, se enfatiza que la percepción precisa de la imagen corporal por parte de los niños y los padres es esencial para combatir la alta prevalencia de sobrepeso y obesidad en la población infantil. Objetivo: Evaluar el acuerdo entre la autopercepción y la percepción materna del peso corporal de los niños y su estado de peso corporal. Métodos: En total, se evaluaron 935 niños de 6 a 10 años y 922 madres. El estado del peso corporal se evaluó mediante medidas de peso y altura corporal y la percepción de la imagen corporal mediante un software para evaluar la percepción del cuerpo del niño. Resultados: Los niños clasificados como "bajo peso" o "peso normal" demostraron una mayor precisión en sus percepciones y una tendencia a sobreestimar en las niñas cuyo estado de peso es "normal", mientras que los niños obesos o con sobrepeso tienden a sobreestimar su estado de peso. Las madres, por otro lado, subestimaron el estado de peso de sus hijos, independientemente del sexo de su hijo.

Conclusión: los niños presentaron percepciones más precisas que las madres con respecto a su peso / tamaño corporal.

Palabras clave: Imagen corporal; Madres; Obesidad pediátrica.

1. Introduction

The interest of the scientific community, especially in areas dedicated to health research, has recently focused its efforts on a greater understanding of childhood obesity (Sepúlveda, Solano, Blanco, La Cruz, & Veiga, 2019; Kim et al., 2020). Obesity rates in children and adolescents have increased from less than 1% in 1975 to almost 6% in girls and 8% in boys in 2016 (Reilly, Hamdouchi, Diouf, Monyeki, & Somda, 2018). When combined, the number of obese young people aged five to 19 has increased more than ten times worldwide (Reilly et al., 2018). This has raised concerns, as childhood obesity has been linked to a variety of chronic diseases (Ruiz, Zuelch, Dimitratos, & Scherr, 2019).

In order to reduce these prevalences in the child population, obesity prevention and intervention programs have been developed (Stice, Shaw, & Marti, 2006), which act through the control of dietary factors, and levels of physical activity and sedentary behavior (Stice et al., 2006). In order to ensure greater effectiveness of these programs, the evaluation of children's body image perception and the involvement of parents in their children's weight loss strategies (Mehdizadeh, Nematy, Vatanparast, Khadem-Rezaiyan, & Emadzadeh, 2020) are fundamental to motivate children to engage in behaviors and actions aimed at reducing their body weight (Chen et al., 2014; Yang, Turk, Allison, James, & Chasens, 2014).

According to Cash and Pruzinski (1990), the concept of body image refers to the mental representation of the body. Composed of two components, one of which is perceptive and refers to the way each person perceives themselves (Rosen, Reiter, & Orosan, 1995) and one subjective, which considers the thoughts and feelings that the perceived body image causes in each individual (Thompson, & Heinberg, 1999).

The development of body image occurs through a continuous process, however, it begins in childhood, since concerns about the search for an ideal body have been evidenced in children from the age of three (Paxton, & Damiano, 2017; Tremblay, Lovsin, Zecevic, & Larivière, 2011). This concern with fitting into specific body patterns, thin for women (Wertheim, & Paxton, 2009), and muscularly defined for men (Ricciardelli, & McCabe, 2011) as well as, the mental construction of one's own body image, may be the result of the influence of the media (Chang, Li, Loh, & Chua, 2019), of concern and dissatisfaction with

the body image arising from parents (Thomas, & De Caro, 2018) or even, of the parents' misperception about their children's actual body size (Chen et al., 2014).

When addressing the perception of body image, studies claim that overweight or obese children tend to underestimate their size, while those with low weight and normal weight tend to overestimate their size (Butler et al., 2019; Chung, Perrin, & Skinner, 2013; Jackson, Johnson, Croker, & Wardle, 2015). Regarding the parents' perception of their children's weight/body size, Chen et al. (2014) suggest more accurate perception of parents compared to that of their children. Other investigations claim that both parents and children demonstrate misperception (Almoosawi, Vingeliene, Karagounis, & Pot, 2016; Leppers et al., 2017). Therefore, the development of studies based on the perception of parents and children and its association with the real size of the child is fundamental to clarify this controversy.

Therefore, the objective of the present study was to verify the agreement between the self-perception and maternal perception of the children's body weight with their body weight status.

2. Methods

The present study is characterized by exploratory research quali-quantitative, because it employs quantitative and qualitative research techniques (Pereira et al. 2018). Developed by researchers, doctoral students and master's students, responsible for applying the techniques. The study was approved by the Human Research Ethics Committee (CEP) of the University of the State of Santa Catarina (UDESC) under protocol number 1.351.239/2015.

Participants

The study population consisted of male and female schoolchildren, aged between six and 10 years, enrolled in elementary school, in state public schools in the southwestern mesoregion of the state of Mato Grosso, Brazil, in 2018.

According to the State Department of Education, there were 3479 students enrolled in elementary school in 2018. All children in that age group who were enrolled and attending classes and their respective mothers were invited to participate in the study. The sample was selected for convenience.

Procedures and instruments for data collection

The questionnaires and evaluations were completed on the premises of the educational institutions on days and times made available by the institutions. Initially, the teachers and parents of the students were contacted to explain the objectives and importance of the study and the Free and Informed Consent Term (FICF) was delivered together with the questionnaire to be answered by the mothers. After return of the signed FICF and the completed questionnaire, the students signed the consent form for the start of collections. This was carried out in a reserved location in the presence of trained researchers, and consisted of anthropometric measurements and measuring body image perception.

Evaluation of body image perception of the children

The perception of children's body image was evaluated using software for Assessing Child Body Perception (SAPECO) (Ferrari, 2016) developed with the purpose of evaluating the subjective and perceptual components of the body image of children between six and 10 years of age, male and female, according to their skin color. There are nine body figures arranged side by side, representing a continuum of excessive thinness (BMI: 12.0 kg/m²) to severe obesity (BMI=30.0 kg/m²) (WHO, 2007).

The application consists of the demonstration of nine body figures, presented through videos: 0s to 1s = front view of the figure (static figure), 1s to 4s = complete rotation (360°) of the figure, 4s to 5s = front view of the figure (static figure). After the demonstration, the nine body figures are shown arranged side by side, represented by a letter of the alphabet. At this moment, the child is asked to click on the letter that represents the body most similar to their own (perceived figure).

After viewing the same figures on a printed version, the mother of each child also indicated the figure that most closely represented the body of their child (figure perceived by the mother).

As the body figures on the SAPECO represent ranges of Body Mass Index (BMI) specific for sex and age, the BMI value of each child was converted to the number of the silhouette that actually represented their body (real figure). The precision of the size perceived by the child and the mother was obtained by subtracting the number corresponding to the “real” figure from the “perceived” figure, with negative values indicating “underestimation of weight/body size”, zero, “precision”, and positive values “overestimation of weight/body

size”, as performed by Saxton, Hill, Chadwick e Wardle (2009), after agreement between the researchers of the study, because it responds to the objective of verifying the accuracy of the of children’s body image perception.

Evaluation of body weight status

The body weight status was obtained through the BMI, which uses the body mass (kg) ratio divided by height (m) squared. The values referring to the measurements were obtained through standardized procedures (Ross, & Marfell-Jones, 1991). The classification followed the criteria established by Cole (2000); Cole, Flegal, Nicholls, & Jackson (2007). A from four categories, “low weight” (thinness I, II, and III), “normal weight”, “overweight”, and “obesity”.

Statistical analysis

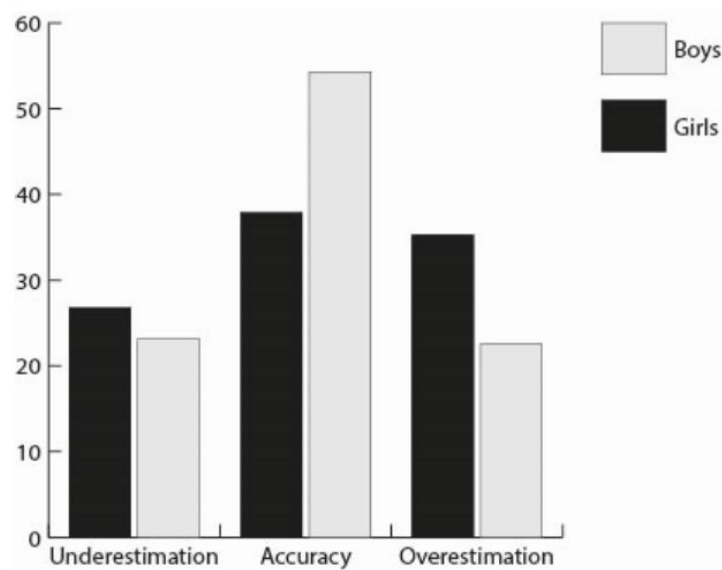
Initially, descriptive analysis using relative and absolute frequencies was used to characterize the subjects. The association between self-perceived weight/body size and body weight *status* according to sex was evaluated using the Chi-squared and Fisher's exact tests, as well as the association between maternal perception of body weight/body size of their child and the child’s body weight *status* according to sex. All analyzes were conducted in the software *Statistical Package for Social Sciences* (SPSS), version 20.0[®], considering a significance level of 5%.

3. Results

In total 935 children aged between six and 10 years were evaluated, 457 boys (48.9%) and 478 girls (51.1%), and 922 mothers participated in the study, 451 mothers of boys and 471 of girls.

Regarding the accuracy of body image perception according to sex (Figure 1).

Figure 1. Self-perception of body image of schoolchildren according to sex. Mato Grosso, Brazil. 2018.

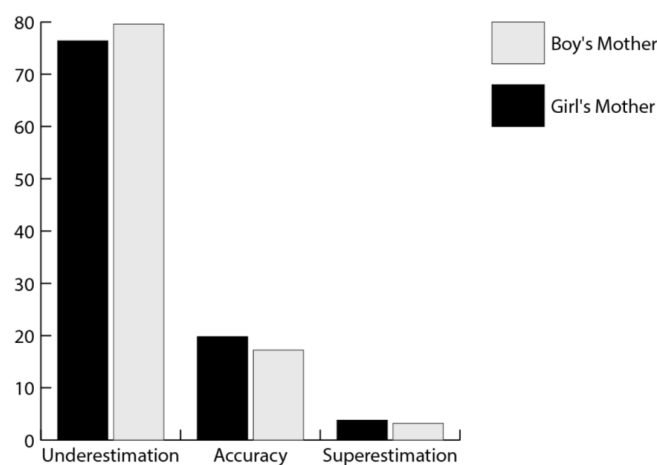


Source: Furstenau (2018).

It is possible to observe that 37.9% of girls and 54.3% of boys presented an accurate perception. Demonstrating that boys were more likely to perceive their body image in a real way.

Figure 2 presents the prevalences regarding the maternal perception of the weight/body size of their child. Regardless of sex.

Figure 2. Maternal perception of the body image of schoolchildren according to the sex of their children. Mato Grosso, Brazil. 2018.



Source: Furstenau (2018).

The majority of mothers underestimated the body weight of boys (79.6%) and girls (76.4%). It represents a lack of accuracy of mothers to perceive their children's body image as they really are, regardless of their gender

With regard to self-perception of body image, it can be seen that it was associated with BMI (p-value > 0.01) (Table 1).

Table 1. Association between self-perceived body weight and body weight *status* according to sex in schoolchildren from Mato Grosso, Brazil. 2018.

WEIGHT STATUS	Underestimate %(n)	Accurate %(n)	Overestimate %(n)	P-value
Low Weight				
Boys (n=264)	24.6(065)	64.8(171)	10.6(028)	<0.01*
Girls (n=273)	29.7(081)	49.8(136)	20.5(056)	
Normal Weight				
Boys (n=99)	22.2(022)	45.5(045)	32.3(032)	<0.01*
Girls (n=109)	25.7(028)	27.5(03)	46.8(051)	
Overweight				
Boys (n=34)	20.6(007)	38.2(013)	41.2(014)	<0.01*
Girls (n=44)	13.6(006)	13.6(006)	72.7(032)	
Obese				
Boys (n=60)	20.0(012)	31.7(019)	48.3(029)	<0.01*
Girls (n=52)	25.0(013)	17.3(009)	57.7(030)	

% relative frequency; n: absolute frequency. * p-value <0.01 according to the chi-squared and Fisher's exact test. Source: Furstenau (2018).

It can be seen that the majority of low weight students perceived their weight/body size accurately and some underestimated it. Among those of normal weight, it was observed that boys tended to perceive themselves accurately while girls overestimated their image. In the overweight children, girls overestimated their body size, while among boys there was no higher prevalence. For those with obesity, in general there was overestimation by both boys and girls (p-value > 0.01) (Table 1).

From the data presented in Table 2, it can be observed that the majority of mothers, independent of the sex of their children, tended to underestimate their weight/body size, especially as the children's body weight status increased (p-value <0.01).

Table 2. Association between maternal perception of their child's body weight according to sex in schoolchildren from Mato Grosso, Brazil. 2018.

WEIGHT STATUS OF CHILD	MATERNAL PERCEPTION			P-value
	Underestimate %(n)	Accurate %(n)	Overestimate %(n)	
Low Weight				
Boys (n=264)	72.0(190)	23.9(063)	4.2(011)	<0.01*
Girls (n=273)	65.2(178)	29.3 (080)	5.5(015)	
Normal Weight				
Boys (n=99)	86.9(080)	11.1(011)	2.0(002)	<0.01*
Girls (n=109)	89.9(098)	9.2(010)	0.9(001)	
Overweight				
Boys (n=34)	100.0(054)	0.0(000)	0.0(000)	<0.01*
Girls (n=44)	100.0(044)	0.0(000)	0.0(000)	
Obese				
Boys (n=60)	80.7(364)	16.4(074)	2.9(013)	<0.01*
Girls (n=52)	100.0(045)	0.0(000)	0.0(000)	

% relative frequency; n: absolute frequency. * p-value <0.01 according to the chi-squared and Fisher's exact test. Source: Furstenau (2018).

4. Discussion

The present study found that while mothers underestimated their child's weight/body size, the majority of the children demonstrated a correct perception, especially among boys and those with a low body weight *status*.

With respect to the perception of body image in children and adolescents with normal weight and low weight, previous research draws attention to their perception of themselves as

being overweight when they have a healthy weight (Chen et al., 2014; Jackson et al., 2015; Leppers et al., 2017).

In the present study, in general, low weight schoolchildren demonstrated a higher prevalence of accuracy in relation to their weight/body size, especially among boys, and those with normal weight. In girls with healthy weight there was a tendency to overestimation, which can be justified by the desire to fit into a thin pattern socially recommended as an ideal of beauty for women (Wertheim & Paxton, 2009).

In the case of the overweight and obese children and adolescents, data from the current investigation found that overweight girls overestimated their weight/body size, whereas among boys there was no higher prevalence. Among those with obesity, overestimation was observed in both boys and girls. This differs from the majority of studies in the investigated age group, which found underestimation of body weight/size among overweight and obese children and adolescents (Chen et al., 2014; Leppers et al., 2017; Edwards, Pettingell, & Borowsky, 2010). Of the possible reasons for the differences between the prevalences found are cultural aspects, age group, and the instruments used, since some studies have evaluated perception through visual scales, while others, based on closed questions, such as, “how do you perceive your body?”.

In addition, the difficulty of perceiving oneself as having excess weight could be attributed to a lack of recognition, since it has become normative in our society, given the high current prevalence of excess weight and obesity (Reilly et al., 2018). Maximova et al. (2008) observed that children and young people exposed to overweight/obesity in their immediate environments, such as parents and schoolmates, may develop false perceptions of what constitutes an appropriate weight *status*. Obese children, being more vulnerable to this influence, are more susceptible to perceiving themselves with normal weight than their older peers (Chung et al., 2013; Maximova et al., 2008). It is worth noting that the frequency of overweight and obese children in the present study is lower than the other categories, normal and low weight, which may justify these children not underestimating their weight/body size, contrary to findings in other studies, since their peers are at or below healthy weight and thus, their reference is configured in children with a lower body weight *status*.

Regarding the perception of excess weight, as a predictor for engaging in actions or behaviors aimed at loss and maintenance of body weight (Chen et al., 2014), the overestimation by overweight and obese students found in the current study may prove to be a crucial factor so that they adopt lifestyle behaviors that favor the acquisition of a healthy body weight (Chen et al., 2014; Yang et al., 2014).

Another aspect addressed demonstrates that the majority of mothers, regardless of the sex of their children, tend to underestimate the body weight of their children, especially as their body weight *status* increases. Previous studies show that parents tend not to recognize excess weight in their children (Almoosawi et al., 2016; Yalçın, Serdaroglu, & Ince, 2016) being that, in most cases, they underestimate their body size.

This difficulty in recognizing the real size of their children's bodies can be attributed to several factors, such as the level of education (Yalçın et al., 2016), maternal dissatisfaction with their own bodies (Thomas & De Caro, 2018) idealization of aesthetic standards (Heidelberger & Smith, 2016) influence of the media (Heidelberger & Smith, 2016), maternal eating behaviors (Almoosawi et al., 2016), and maternal body weight (Yalçın et al., 2016), among others.

It is also noteworthy that scientific and layperson definitions for obesity may not coincide; with the increase in overweight and obesity rates, the community perception of what is considered normal weight tends to change. Thus, children classified as overweight may be seen by parents as having normal weight (Lampard, Byrne, Zubrick, & Davis, 2008) or simply for lack of understanding of what is overweight and obesity in children (Jain et al., 2001). In addition, some parents believe that their children will overcome overweight as they develop, as they get older, and that being overweight in childhood is healthy, especially among low-income families (Jain et al., 2011).

For Lampard et al. (2008) the parents may simply not be able to notice their children's overweight, perhaps because they are more concerned with their children's overall health than their body weight rating, or because they are reluctant to accept overweight and obesity (Jain et al., 2011), since if this fact is accepted, behaviors to revert this situation need to be considered.

It is only possible to carry out interventions aimed at reducing childhood obesity when the parents have the correct perception. However, it is necessary to reduce parents' underestimation in relation to their child's body size and increase their awareness of the effects of overweight and obesity on health, children's quality of life, and body image satisfaction (Lampard et al., 2008).

As limitations, the cross-sectional design stands out, which prevents the establishment of causal inference as well as the use of the scale of body silhouettes in printed form to assess the perception of the children's body image by mothers, which does not allow the representation of the individual as a whole (Kay, 1996), although, Ferrari, Martins, Pelegrini, Matheus, & Petroski (2016), found strong correlations between BMI and body image

perception. Finally, the low frequency of children classified as excess weight, overweight, and obese may be a limitation, however, the data reflect the reality observed in a representative sample of children aged six to 10 years in the investigated region.

As a strong point of the study, we highlight the use of the results to alert Physical Education and health professionals of the need to assess the perception of children's body image, in order to assist in the development and implementation of interventions for loss and control of body weight in this population.

5. Conclusion

It was concluded that, in general, the majority of children demonstrated correct perception, mainly among those of the male gender and with a low body weight *status*. Among the children, variations were found according to their body weight *status*, that is, those with low or normal weight tended to present more accurate perceptions than obese or overweight children, who underestimated their body size, as well as girls whose *status* was rated as normal.

Regarding maternal self-perception, the majority of mothers, regardless of the sex of their children, tended to underestimate their weight/body size, especially as the children's body weight *status* increased.

These conclusions shed important light on current and future discussions about the relevance of self-perception of body image, as well as maternal perception, as subsidies for the prevention and treatment of childhood obesity.

Also, new studies in this field should be developed, especially in the investigation of children's body image perception and associated factors. In order to understand the aspects that influence the perception of the infant body.

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