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Perceived body image in schoolchildren and its relationship with maternal perception of child body weight and some lifestyle factors in Tehran, Iran

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A B S T R A C T

Objective: Obesity and the physical and psychological conditions associated with it are affected by factors including genetics, lifestyle, and body image (BI) perception. Therefore, an accurate understanding of the leading causes of and establishing appropriate approaches to controlling obesity would be important issues. The aim of this study was to evaluate the BI perception in schoolchildren and its relationship with maternal perception of child's weight and some lifestyle factors in Tehran, Iran.

Methods: In this cross-sectional study, 1598 children were categorized as obese or nonobese according to the World Health Organization's reference charts of body mass index. Collins' figure rating scale, along with a demographic questionnaire, was used to assess the BI perception and some lifestyle factors in children and mothers of obese children. The relationships between variables and body image were analyzed using chi-square and logistic regression analyses on SPSS (version.19).

Results: About 72% of obese and 52% of nonobese children did not have an accurate body image perception. The majority of obese children's mothers (60.2%) had an accurate perception of their children's BI. Obese children's BI perception was significantly correlated with the mother's perception of the child's body image ($p = 0.005$) and father's education ($p = 0.002$).

Conclusion: It was found that most obese school children had an inaccurate perception of body image. Mothers of obese children had a better perception of their children's BI. It is suggested that interventions to improve children's and parents' BI perception and lifestyle be used in conjunction with other obesity prevention approaches.

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Introduction

Childhood obesity is now considered an emergency worldwide. About 80% of obese children grow to be obese adults, suffering from its physical and psychological complications. According to the WHO, about 75% of deaths in developing countries are expected to be caused by

chronic diseases mostly related to obesity by 2020 [1]. The prevalence of childhood obesity is growing throughout the world, especially in developing countries. Iran is considered a country with a high prevalence of childhood obesity [2]. As obesity is a multifactorial condition affected by several factors including genetics, lifestyle, and body image (BI), an accurate and comprehensive understanding of the leading causes, followed by establishing proper approaches, would be important in its control [3].

BI is one's perception of one's own body and is related to body growth and development, which is influenced by various factors such as age, sex, media, and ethnicity. These factors may affect several aspects of life including emotions, behaviors, and, particularly, food intake [4-6].

Several studies found that about 60% of obese children have an inaccurate BI leading to an unhealthy diet and dietary behavior [7, 8] as well as low self-confidence and depression [9-11].

Parents' perception of children's body weight may be an important factor in improving their lifestyle [12].

There are few studies on body image during childhood in Iran [13, 14]. One study evaluated the association between body weight perception and actual body mass index (BMI) was in a nationally representative sample of a pediatric population and found a significant mismatch between actual body weight status and body shape satisfaction [14]. In the other study, Pakpour et al investigated the mothers' awareness of weight problem in their children and evaluated the impact of an educational intervention on mothers' recognition of obesity in their children. They found that the majority of mothers in Iran did not have a good understanding of healthy body weight for children and therefore might not be able to detect the development of obesity in their children. They suggested that educational interventions may reduce such misconception and improve parental care [13]. The main aim of this study was to evaluate the BI of obese schoolchildren and its relationship with the mother's perception of the child's BI and lifestyle variables in elementary schools in Tehran, Iran.

Methods

In this cross-sectional study, 1598 schoolchildren of 3rd to 5th grade were randomly selected from 5 elementary schools in municipal district 2 of Tehran, Iran. Inclusion criteria included having the parents' consent to participate in the study, being 9-12 years old, and living with mother. They were excluded if they used any medication or had diabetes mellitus, thyroid disease, or chronic kidney disease. To evaluate the reliability of the instrument used in the study (a questionnaire containing demographic and lifestyle questions and the body image scale), we had 30 children complete the questionnaire on two occasions, 2 weeks apart, in a pilot study. The reliability of the questionnaire was assessed using a paired t test and Wilcoxon-signed rank test (sig.0.184, P, 0.05).

Height and weight of the subjects were measured to the nearest 0.5 cm and 0.2 kg by two trained experts, using a digital stadiometer and a digital scale (SECA) [15]. A research team member read and explained the questionnaire items to the participants before administering the questionnaire.

The participants' perceived BI was evaluated using

Collins' figure rating scale (Figure1), with a reliability coefficient of 0.71 [16, 17, 18]. The figures (allocated for males and females) were shown to each child individually, followed by recording their perception after 1 minute to avoid any bias due to the presence of the researcher. In the next stage, obese children were identified according to the WHO criterion of BMI-for-age > +2 SD [3, 4, 19, 20] and selected to complete the next stage in this study. A similar questionnaire was also completed by the mothers.

The questionnaires contained questions about socioeconomic background, physical activity [21], sleeping status, and screen time (TV and computer). A 24-hour dietary recall was also recorded. The mothers' perception of their children's BI was also assessed [22]. The difference between the perceived BI Z-score and the BMI Z-score was calculated as a measure of BI misperception [16, 17, 24], with negative value indicating an underestimation of weight status.

Socioeconomic status was evaluated based on items regarding the parents' education and occupation and the existence of any household appliances.

The study was approved by the Ethics Committee of Tehran University of Medical Sciences. Data were analyzed using SPSS version 19. Student t test was used to compare the groups on normally distributed quantitative variables. Moreover, chi-square analyses were used to

determine the relationships between independent variables and the children's BI. Finally, we used multiple logistic regression analysis to evaluate the association between BI and other variables.

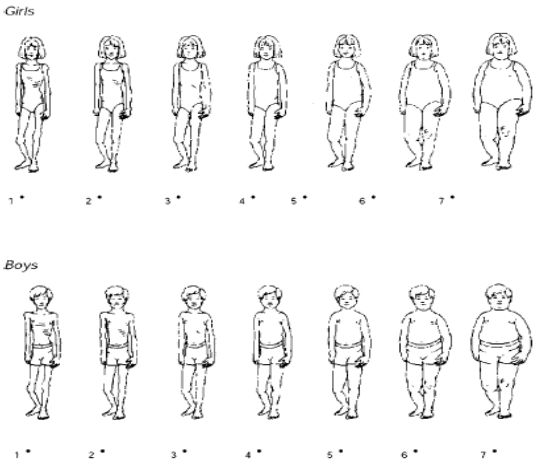

Figure 1. Collins' figure rating scale to assess perceived BI

Results

Of the 1603 participants, 256 (16%) were obese, of whom 132 (51.6%) were females and 124 (48.4%) were males. The mean age of the participants was 10 ± 0.815 years. The ethnic composition of the study sample was similar to that of the population of Tehran city, where Farses make up about 62% of the city's population [25].

About 34% of obese children versus 44.6% of nonobese ones had enough sleeping hours (8-10 h/d) during the night. Moreover, it was shown that 57.2% of obese children spent more than 2 h/d on watching TV and playing computer games, while 80.6% of nonobese children had a screen time of < 2 h/d.

Although nonobese children tended to have a higher amount of physical activity compared with their obese counterparts (> 64% vs > 58%), the difference was not significant. The mean energy intakes of females and males were 1892 ± 89 and 2231 ± 70.3 kcal/day, respectively. However, obese female subjects had a mean energy intake that was significantly ($p < 0.005$) lower than the estimated energy requirement. Table 1 shows the demographic characteristics and lifestyle variables of the participants.

The majority of obese children (72.4%) did not have an accurate perception of their BI and underestimated their body weight. Also, 67.6% of obese subjects (69.7% of females and 65.3% of males) were interested in losing

Table 1. Demographic characteristics and lifestyle variables of the participants

	Obese (n = 256)	Nonobese (n = 1347)
Age, n (%)		
9-year-old	67 (26.2)	350 (26)
10-year-old	92 (35.9)	546 (40.5)
11-year-old	77 (30.1)	404 (30)
12-year-old	20 (7.8)	47 (3.5)
Sex, n (%)		
Male	124 (48.4)	484 (35.9)
Female	132 (51.6)	863 (64.1)
Mother's ethnicity, n (%)		
Fars	168 (63.7)	824 (61.2)
Azari	41 (16)	225 (16.7)
Guilaki, Mazani or Turkmen	14 (5.5)	85 (6.3)
Kord, Lor, or Baluch	18 (7)	66 (4.9)
Arab	4 (3.1)	27 (2)
Other	12 (4.7)	120 (8.9)
Tendency to lose weight		
Yes	173 (67.6)	490 (36.4)
No	83 (32.4)	857 (63.6)
Screen time, n (%)		
0 h/d	36 (14.1)	113 (8.4)
< 1 h/d	61 (23.8)	630 (46.8)
1-2 h/d	84 (32.8)	455 (33.8)
2-6 h/d	75 (29.3)	148 (11)
Night sleep duration		
< 8 h	88 (34.4)	739 (54.9)
≥ 8 h	168 (65.6)	608 (45.1)
Father's occupation		
Staffer	85 (52.8)	
Self-employed	68 (42.2)	
Worker or workless	7 (4.9)	
Mother's occupation		
Staffer	39 (24.2)	
Self-employed	9 (5.6)	
Worker or workless	5 (3.1)	
Housewife	108 (67.1)	
Father's education		
Primary	6 (3.7)	
Secondary	46 (28.6)	
Undergraduate	69 (42.9)	
Postgraduate	40 (24.8)	
Mother's education		
Primary	6 (3.7)	
Secondary	57 (35.4)	
Undergraduate	81 (50.3	
Postgraduate	17 (10.6)	
Energy intake, n (%)		
< 1200 kcal/d	5 (3.1)	
1200-1700 kcal/d	39 (24.2)	
1700-2200 kcal/d	53 (32.9)	
2200-2700 kcal/d	52 (32.3)	
> 2700 kcal/d	12 (7.5)	

Table 2. Correlation between BI and various variables in obese children

Variables	P value
Mothers' perception of their children's body weight	0.005
Age	0.617
Sex	0.118
Ethnicity	0.936
Tendency to lose weight	0.278
Screen time	0.397
Night sleep	0.277
Father's occupation	0.283
Mother's occupation	0.362
Father's education	0.002
Mother's education	0.074
Economic status	0.07
Energy intake	0.613
Regular morning activity	0.142
Regular weekly activity	0.476
Regular summer activity	0.543

their body weight. The mean BI score as reported by obese children was 5, while the mean BI score as rated by their mothers was 6, showing that mothers of obese children had a better perception of their children's BI (60.2% of mothers had an accurate BI of their children). On the other hand, only 51.8% of nonobese children had an inaccurate perception of their BI (2.4% of children rated themselves 6 and 7), and 36.4% of them (40.5% of females and 29.2% of males) intended to reduce their body weight. Our study showed a greater tendency to lose body weight among obese children.

A significant correlation ($p < 0.05$) was found between BI and sex in nonobese children. Female children were 2.47 times as willing to lose body weight as males. According to the anthropometric analysis, only 1.4% of nonobese children were categorized as very thin, while 5.8% perceived themselves to be very thin. A significant correlation was found between non-obese children's perceived BI and their mothers' perception of their body weight ($p = 0.001$) on the one hand and their fathers' educational level on the other hand ($p = 0.01$) (Tables 2, 3).

Discussion

The main finding of this study was that the majority of schoolchildren did not have an accurate BI perception and did underestimate their body weight. We also found that mother's perception of her child's body weight and father's education were positively correlated with the child's BI perception.

These findings are consistent with previous studies. One study in Iran investigated the mothers' awareness of their children's weight problem and the impact of an educational intervention on improving mothers' recognition of obesity in their children and found that the majority of mothers did not have a general awareness about healthy body weight for children and thus were not able to evaluate the weight status (specifically the obesity) of their children. The educational intervention provided in the study could reduce the number of mothers with misconception [13]. Similarly, Akbari et al reported that 23.3% of parents did not perceive their children as obese [26]. They also found that 50% of children perceived themselves as obese, while only 17.7% of them were overweight or obese. Girls are more likely to have a distorted BI compared with boys [14, 23]. There are other similar findings about BI perception status reported by studies carried out in other regions of the Middle East such as Dubai [27].

Although ethnicity has been indicated to affect BI, our study found no relationship between ethnicity and BI. This may be due to a misreporting of ethnicity among participants. In 2014, a cross-sectional study was conducted in Italy, which evaluated 226 immigrant children and 1206 Italian children in terms of their weight concerns and body dissatisfaction. This study reported a higher rate of dissatisfaction and weight concerns in obese immigrant children [28]. In the USA, 69% of children and 72% of mothers tended to underestimate body weight [29]. It was reported that 80% of obese children in Asian countries were not satisfied with their body weight, with the dissatisfaction being more

Table 3. Correlation between nonobese children's BI perception and their mother's perception of their child's BI and their fathers' educational level

	B	SE	Exp(B)	CI	P
Mother's perception of her child'd BI	1.432	0.447	4.186	1.742-10.059	0.001
Father's education	0.915	0.254	0.401	0 0.244-0.659	0.010
Constant	1.976	0.75	7.211		0.008

prevalent among the immigrant population [30].

A study, in 2010 in Canada, reported that 77% of obese children's parents, 55% of underweight children's parents, and 16% of normal-weight children's parents had an inaccurate BI perception about their children's body weight. It was suggested that factors such as age, gender, weight, and parents' educational level may impact the parents' perception of children's BI [31].

The behavior of parents, especially mothers, can influence BI perception and dietary patterns of their children. Several studies found that maternal obesity had a direct relationship with the child's obesity [32, 33]. Two approaches have been suggested to explain how parents may affect their children's BI perception. First, it is assumed that children may consider their parents as their role models, and, second, parents may directly transfer their thoughts to children [28, 34].

Consistent with previous studies, we also found a significant relationship between the father's educational level and child's BI perception, which may be associated with family structure and patriarchal orientation among Iranian families [5, 31]. However, there was no significant relationship between the mother's educational level and the child's BI perception in our study.

Moreover, similar to the findings of previous studies [35, 36], no significant relationship was seen between socioeconomic status and parents' perception of children's body weight in the present study, although there was a significant relationship between child's BI perception and socioeconomic factors.

The findings of studies are controversial regarding the correlation between factors such as religion, gender, and race and BI of individuals. For instance, while obese African-American women have been reported to have high rates of dissatisfaction with their body weight [37-39], body image dissatisfaction is higher among Hispanic and Caucasian populations [16]. Therefore, it can be suggested that there may be different factors affecting the body image of children in different societies. However, our study found no significant relationship between the mother's ethnicity and children's BI perception. This needs to be addressed in further interventional or cohort studies in the future. It is also possible that either the children or the mothers themselves may have misreported the mother's ethnicity.

Although positive significant relationships were previously reported between obesity and screen time, night sleep, and physical activity [39], no significant relationship was found between these variables and BI in our study. This is despite the fact that obese children may have less sleep time, more screen time, and lower levels of physical activity [5]. It is suggested that the content of a TV program may be more important than the time spent on watching TV.

In our study, 89.7% of children whose mothers had an accurate perception of their children's BI had regular summer activity, while this percentage was 78.1% for mothers who had an inaccurate perception of their child's BI. This may suggest the importance of the accuracy of mothers' perception of their child's BI.

In our study, no significant relationship was observed between energy intake and children's BI perception. However, in girls with obesity, the mean energy intake was significantly lower than the estimated energy requirement. It seems that mothers may have more control over the dietary habits of their daughters compared with their sons.

In agreement with some studies [40, 41], our study showed a similar tendency to lose weight among obese boys and girls, with no significant association with BI. However, this tendency was higher in nonobese females (40.5%) compared with nonobese males (9.2%).

Our study had some limitations, of course. We used self-reported data on variables and estimated energy intake using only a 24-hour recall. It would be better to examine variables more exactly, but we could not do so because of time constraints and collaboration of mothers.

Conclusion

Overall, as in other countries, there is a high percentage of inaccurate BI perception in obese children and their mothers in Iran. It is suggested that the best outcomes of controlling obesity would be achieved when it starts in early life, specifically at school age. To reduce the physical and psychological consequences of obesity, it is recommended that interventions to improve children's and parents' BI perception and lifestyle be used in conjunction with other obesity prevention approaches.

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Conflict of Interests

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