

# **Mothers' perception of obesity in schoolchildren: a survey and the impact of an educational intervention**

**Amir H. Pakpour,<sup>1</sup> Mir Saeed Yekaninejad,<sup>2</sup> Hui Chen<sup>3</sup>**

## **Abstract**

**Objectives:** To investigate mothers' awareness of their children's weight problem, and to evaluate the impact of an educational intervention on improving mothers' recognition of obesity in their children.

**Methods:** Twelve primary schools from Tehran, Iran, were randomly chosen. Obese children were selected, and 300 mothers participated in the study. A questionnaire was completed by the mothers, who were then randomly divided into two groups. One group received education on obesity, whereas the other group did not receive any intervention. After 2 months, the same questionnaire was completed by both groups. A multiple logistic regression was performed.

**Results:** Mother's pre-existing knowledge on obesity, their education and occupation, as well as family income, had significant effects on mothers' accuracy in identifying obesity in their children. The educational intervention significantly improved mothers' ability to identify obesity in their children compared with those without any intervention (OR = 15.23; 95%CI 5.95-38.96).

**Conclusions:** In Iran, a large proportion of mothers do not have general knowledge on healthy body weight for children, thus failing to recognize that their children are obese. Educational interventions could reduce the rate of such mistake and subsequently alter parental care.

*J Pediatr (Rio J). 2011;87(2):169-174: Obesity, parents, children, misperception, health education, Iran.*

## **Introduction**

Obesity is considered a major health problem among children.<sup>1</sup> The prevalence of childhood obesity is rising in developed countries.<sup>2</sup> In the United States, 25% of children are overweight, and 11% are obese.<sup>3</sup> Also, 7.7% of Brazilian children aged 10-12 years had excessive fatness.<sup>4</sup> The same prevalence can be seen in European countries as well.<sup>5,6</sup>

The rising rate of childhood obesity in developing countries is as high as that of developed countries. Countries with the highest rates of overweight/obese children are located mainly in the Middle East.<sup>7</sup> According to a recent study, prevalence of childhood obesity in Iran was 6.4 and 8% among children aged 2-3 years and among those aged

1. PhD. Department of Public Health, Qazvin University of Medical Sciences, Qazvin, Iran.

2. PhD. Department of Epidemiology and Biostatistics, School of Public Health, Tehran University of Medical Sciences, Tehran, Iran.

3. PhD. Department of Medical and Molecular Bioscience, Centre for Health Technology, Faculty of Science, University of Technology, Sydney, Australia.

No conflicts of interest declared concerning the publication of this article.

**Suggested citation:** Pakpour AH, Yekaninejad MS, Chen H. Mothers' perception of obesity in schoolchildren: a survey and the impact of an educational intervention. *J Pediatr (Rio J)*. 2011;87(2):169-174.

Manuscript submitted Oct 19 2010, accepted for publication Dec 22 2010.

doi:10.2223/JPED.2078

4-5 years, respectively.<sup>8</sup> In another study, it was suggested that 6.9% of boys and 4% of girls aged 10-19 years old are obese.<sup>9</sup> According to World Health Organization, Iran is one of the seven countries that have the highest rate of childhood obesity.<sup>10</sup>

Childhood obesity/overweight leads to more serious health problems in adulthood than adult-onset obesity. Childhood obesity has significant impact on growing bones and on endocrine, cardiovascular, and gastrointestinal systems. Obesity causes hyperlipidemia, hypertension, glucose intolerance, and infertility. Furthermore, obesity has negative effects on mental health, such as: depression, low self-esteem, and anxiety. Obese children are more likely to remain obese in adulthood.<sup>11-13</sup> Studies show that up to 50% of obese adolescents become obese adults.<sup>14,15</sup> Moreover, the costs of obesity-related illnesses in children have tripled from US\$ 35 million in 1979 to US\$ 127 million in 1999.<sup>16</sup>

Obesity in children is due to many factors, such as poor diet and physical inactivity.<sup>17</sup> Previous studies demonstrated that, if one or both parents are obese, the risk of a child becoming obese in adulthood can increase by 3-10 times.<sup>15</sup> This is probably shaped early in childhood, influenced by parental practices and by family environment. In another words, parents play a crucial role in the formation of dietary habits and patterns of physical activity in children.<sup>18</sup>

Therefore, obesity prevention programs will only be successful if the parents can actively get involved.<sup>19</sup> The success firstly depends on the ability of parents to identify child's overweight/obesity, and to understand that obesity is a risk factor for long-term health problems. If the parents fail to recognize that their child is obese, they would be reluctant to take any action to change their child's behavior, which may possibly accelerate the development of the child's obesity problem.<sup>20</sup> However, studies show that many parents are not cautious or worried about their children's body weight, because some of the parents either underestimate child's body weight or believe that obesity is inherited, thus unchangeable.<sup>1,21,22</sup> Studies suggest that targeting parents is a cost-effective strategy for the management of weight-related problems in children.<sup>23</sup>

The aims of the study were twofold: firstly, to investigate mothers' awareness of their children's body weight; secondly, to evaluate the effect of an educational intervention on mothers' recognition of obesity in their child.

## Methods

Cluster sampling approach was used for data collection. Twelve primary schools in diverse socioeconomic areas of Tehran, Iran, were randomly chosen. In each school, 25 samples were randomly selected. Children's body weights and heights were measured by trained personnel following the standardized procedures described in previous studies.<sup>8</sup>

Children were eligible if they had body mass index (BMI) of 95th percentile or higher for their age and sex. When the obese children were selected, their mothers were invited to participate in the study.

## Questionnaire

A questionnaire was used in order to collect data for the study. The questionnaire comprised several sections. The first section included demographic data, such as: age and sex of the child, mother's education level, and monthly family income. Mothers' pre-existing knowledge on healthy eating habits was assessed in the next section, using the strategy adopted from Etelson et al.'s study.<sup>1</sup> The questions on mothers' knowledge consisted of multiple-choice questions like the following:

Question 1: How much fruit juice is healthy for a child to drink each day? (one box of juice = 240 mL)

- a) one to two juice boxes
- b) three to four juice boxes
- c) five to six juice boxes
- d) seven to eight juice boxes

Question 2: How often is it appropriate to dine at a fast food restaurant?

- a) once a month
- b) once a week
- c) three times a week
- d) five times a week

The attitude of the mothers towards overweight/obesity in childhood was assessed in the third section. This part included four questions that measured mothers' opinion on some risks for their children's health, such as passive smoking, reluctance to read aloud, overweight, and television watching. The response ranged from 1 (not worried at all) to 4 (extremely worried). In the last question, the mothers were asked to classify their children's weight according to a three-level scale: underweight, normal weight, or obese.

## Educational intervention

The questionnaire was completed by the mothers before they were randomly divided into two groups, namely control and intervention groups. The randomization procedure was performed using a block-stratified randomization method. In the intervention group, the mothers were educated by a series of lectures and by a pamphlet on childhood obesity, its risks, and the criteria for childhood obesity. The lectures were conducted in schools. The pamphlet contained fact sheets on childhood obesity, growth charts, and information about how to measure BMI in children. Two months later,

mothers' perception of child's weight was assessed again with a single question.

The study was approved by the Human Ethics Committee of Qazvin University of Medical Sciences. All mothers have given written consent.

### Data analysis

Data were expressed as mean  $\pm$  standard deviation, and analyzed by SPSS software (version 16, IBM Corporation, New York, USA). A multiple logistic regression was conducted for the results of the two stages, before and after intervention. In the first stage, the regression was used to determine the pre-existing variables that most contributed to mothers' perception of children's obesity status; in the second stage, when the regression was adjusted for potential confounders, to assess the effect of the educational intervention on mothers' perception about children's obesity status. In both models, all variables, including child's sex, mother's pre-existing knowledge on obesity, her education and occupation, as well as family income and birth order, were entered. Then, backward elimination (selection level: 5%) was used to identify the significant variables. Hosmer-Lemeshow goodness-of-fit test indicated that these models were suitable ( $p > 0.20$ ).

Sample size was calculated using G\*Power software<sup>24</sup> for logistic regression model, and considering a significance level  $\alpha = 0.01$  and power of analysis defined as  $1 - \beta = 0.95$ . Due to cluster sampling approach, sample size was subsequently multiplied by design effect (2). Final sample size required for this study was 300, with an estimate of 25 samples in each school. Subsequently, 12 schools were randomly

selected for data collection. The design effect of the study and the odds ratio (OR) for sample size calculation were estimated from a pilot study.

### Results

Three hundred mothers participated in the study. Forty-two percent of the children ( $n = 126$ ) were first child. The mean age of mothers for control and intervention groups were  $33.2 \pm 6.4$  and  $34.1 \pm 3.7$  years, respectively. There was no significant difference in mothers' age between the two groups ( $p = 0.56$ ). Moreover, the children's average age was not different between the two groups (control group:  $9.1 \pm 1.9$ , intervention group:  $9.1 \pm 1.6$ ) either.

There was no significant difference in demographic characteristics between the two groups (Table 1). More than half the mothers (51%) thought that eating fast food once a week is appropriate. Furthermore, most of the mothers (65.7%) believed that drinking one to two juice boxes per day is healthy.

Table 2 summarizes the questionnaire data regarding mothers' attitude towards some common health risks. Mothers showed similar levels of concern on obesity and on reluctance to read aloud. About 26% of the mothers considered childhood obesity as a health risk, while 63% considered passive smoking in the household as a health risk.

Before intervention, the multiple logistic regression analysis showed that mothers who had pre-existing knowledge of obesity were more likely to identify children's obesity than mothers who did not have such knowledge

**Table 1 -** Demographic characteristics of the mothers

Characteristic	Intervention group	Control group	Statistic test	
	n (%)	n (%)	$\chi^2$	p
Mother's education (years)				
0-5	60 (40.0)	57 (38.0)	0.180	0.914
5-9	48 (32.0)	48 (32.0)		
> 9	42 (28.0)	45 (30.0)		
Monthly family income (US\$)				
< 500	46 (30.6)	48 (32.0)	0.141	0.932
500-750	52 (34.7)	49 (32.7)		
> 750	52 (34.7)	53 (35.3)		
Child's sex				
Boy	77 (51.33)	81 (54)	0.214	0.644
Girl	73 (48.67)	69 (46)		

$\chi^2$  = chi-square test.

**Table 2 -** Mothers' opinion regarding health risks to a child

Mothers' attitude regarding	Not worried (%)	A little worried (%)	Quite worried (%)	Extremely worried (%)
Living with a smoker	3.0	12.0	21.3	63.7
Reluctance to read aloud	32.7	49.0	11.0	7.3
Overweight	25.7	48.0	14.0	12.3
Watching television more than 3h per day	16.7	39.3	28.7	15.3

(OR = 2.88; 95% confidence interval [95%CI]: 1.71-4.85). Additionally, mothers with higher education tended to identify children's weight problem better than those with lower education (OR = 2.75; 95%CI 1.45-5.21). Moreover, working mothers were more likely to recognize childhood obesity than housewives (OR = 15.21; 95%CI 1.94-119.40). Family income was positively related to mothers' ability to identify obesity in their children (Table 3).

In the second questionnaire, multiple logistic regression adjusted for potential confounders revealed that interventional education had significant effect on improving the accuracy of mothers' ability to identify children's obesity (OR = 15.23; 95%CI 5.95-38.96). Moreover, pre-existing knowledge of obesity, birth order and family income were significantly related to mothers' perception of children's weight problem ( $p \leq 0.01$ , Table 4). Thirty-five percent of the mothers underestimated

their children's body weight before intervention. However, this mistake was reduced to 18.3% after the educational intervention.

### Discussion

Parental care is important in shaping children's eating habits and patterns of physical activity. It has been suggested that, in general, parents seemed more concerned about children being under rather than overweight.<sup>25</sup> This could result in the encouragement of overeating by parents, especially by the mother, who is usually the primary carer.<sup>25</sup> Therefore, the success of weight management in childhood depends on how well parents can identify their children as overweight/obese. Moreover, parents must also be aware of the link between childhood obesity and its health risks in the long term.

**Table 3 -** Mothers' accuracy in identifying their children's obesity before the intervention

Mothers' perception about children's obesity status (before educational intervention)	OR (95%CI)	p
Pre-existing knowledge on childhood obesity		
No	1.0 (ref)	
Yes	2.88 (1.71-4.85)	< 0.001
Mother's education		
Lower than high school diploma	1.0 (ref)	
High school diploma and higher	2.75 (1.45-5.21)	0.002
Mother's occupation		
Housewife	1.0 (ref)	
Working	15.21 (1.94-119.40)	0.010
Family income (US\$)		
Low ( $\leq 500$ )	1.0 (ref)	
High ( $> 500$ )	1.97 (1.14-3.40)	0.015

95%CI = 95% confidence interval; OR = odds ratio; ref = reference category.

**Table 4 -** Association between mother's perception of childhood obesity and educational intervention, adjusted for potential confounders

<b>Mothers' perception about children's obesity status (after educational intervention)</b>	<b>OR (95%CI)</b>	<b>p</b>
Experimental groups		
Control	1.0 (ref)	
Intervention	15.23 (5.95-38.96)	< 0.001
Pre-existing knowledge on childhood obesity		
No	1.0 (ref)	
Yes	3.32 (1.66-6.63)	0.001
Birth order		
None first child	1.0 (ref)	
First child	2.43 (1.16-5.09)	0.019
Family income (US\$)		
Low ( $\leq$ 500)	1.0 (ref)	
High ( $>$ 500)	2.85 (1.42-5.72)	0.003

95%CI = 95% confidence interval; OR = odds ratio; ref = reference category.

To the best of our knowledge, the present study was the first to assess the impact of an educational intervention on improving mothers' awareness of childhood obesity and its health risks. In this study, we showed that more than 1/3 of the Iranian mothers failed to recognize that their children were obese. Previously, a study carried out by Myers & Vargas<sup>22</sup> assessed the perception of the staff members and of parents in their hospital in Spain. They showed that 18.7% of the participating parents thought that their children were not obese, and 35% of them did not believe that their children were obese when they were told so. Another study demonstrated that 79% of mothers did not consider their children obese, while all the obese mothers in the study considered themselves obese.<sup>19</sup> These findings are consistent with those reported in our study.

As shown in this study, mother's education level and family income are the two major factors determining mother's perception of childhood obesity. The education level is correlated to the level of pre-existing knowledge of childhood obesity and of its related risk. As a result, mothers with high education are more likely and willing to consider their children's weight as a problem. If the parents are conscious about the risks of childhood obesity, they will probably take actions to control child's body weight. Previous studies reported that the low education level of parents is a possible risk for the development of obesity in their children, since these parents are not usually able to recognize the child's weight issue.<sup>26,27</sup> Moreover, Baughcum et al.<sup>19</sup> showed that parents with low education level were less concerned about their children's body weight and seldom considered them obese. This may have happened

because their knowledge on health issues and obesity were limited by poor education. However, the questionnaire also suggested poor knowledge of healthy lifestyle in the general population, reflected by mothers' responses to the questions on the frequency of eating junk food and on the concerns about adverse household risk factors.

The income level of a family can also be directly related to parents' education level, as women with high education are more likely to be well employed. Children born in a low-income family are less likely to be recognized as overweight/obese. It seems that parents with low income believe that obesity at childhood suggests health and fitness; therefore, they do not worry if their children are overweight<sup>20</sup>; and, consequently, will take no action to control children's excessive body weight.

Accordingly, education about general knowledge of childhood obesity and its related health risks is crucial to control the rising rate of childhood obesity. In the present study, we have shown that, even among mothers with high education, the intervention markedly improved their perception of childhood obesity. After the intervention, more mothers realized that their children were overweight/obese. Then, they might take measures to control the child's body weight using the knowledge learned from the lectures and handout materials. This improvement in parents' perception also suggests that the public information group education program for parents was effective in reducing childhood overweight/obesity.<sup>28</sup>

One limitation of our study was that the effectiveness of the intervention was assessed based on mother's perceptions of childhood overweight/obesity. The impact on fathers was

not included. Such impact will need to be investigated in a separate study. resources currently available, such as the press, are not sufficient to acquire general knowledge on childhood obesity and healthy lifestyle. These findings were in line with Shelton et al.'s study, in which a brief group education program for parents was effective in reducing childhood overweight/obesity.<sup>28</sup>

In summary, our study showed that the majority of Iranian mothers estimated the weights of their children correctly. However, only a small portion of them thought that childhood obesity was a health risk. Such misperception exists in both Iranian and western countries; therefore, it is very unlikely to be culture dependent. It also seems directly related to education and household income. Moreover, an educational intervention can improve mothers' perception of their children's weight problem, and may change the way parents control their children's body weight. Future studies are needed to evaluate the long-term effect of such educational intervention on reducing childhood overweight/obesity.

## References

1. Etelson D, Brand DA, Patrick PA, Shirali A. *Childhood obesity: do parents recognize this health risk?* *Obes Res.* 2003;11:1362-8.
2. Pergher RN, Melo ME, Halpern A, Mancini MC; Liga de Obesidade Infantil. *Is a diagnosis of metabolic syndrome applicable to children?* *J Pediatr (Rio J).* 2010;86:101-8.
3. Dehghan M, Akhtar-Danesh N, Merchant AT. *Childhood obesity, prevalence and prevention.* *Nutr J.* 2005;4:24.
4. Kelishadi R. *Childhood overweight, obesity, and the metabolic syndrome in developing countries.* *Epidemiol Rev.* 2007;29:62-76.
5. Franco M, Sanz B, Otero L, Domínguez-Vila A, Caballero B. *Prevention of childhood obesity in Spain: a focus on policies outside the health sector. SESPAS report 2010.* *Gac Sanit.* 2010;24 Suppl 1:49-55.
6. Livingstone MB. *Childhood obesity in Europe: a growing concern.* *Public Health Nutr.* 2001;4:109-16.
7. James PT. *Obesity: the worldwide epidemic.* *Clin Dermatol.* 2004;22:276-80.
8. Dorosty AR, Siassi F, Reilly JJ. *Obesity in Iranian children.* *Arch Dis Child.* 2002;87:388-91.
9. Azizi F, Allahverdian S, Mirmiran P, Rahmani M, Mohammadi F. *Dietary factors and body mass index in a group of Iranian adolescents: Tehran lipid and glucose study-2.* *Inter J Vitam Nutr.* 2001;71:123-7.
10. Gurney M, Gorstein J. *The global prevalence of obesity-an initial overview of available data.* *World Health Stat Q.* 1988;41:251-4.
11. Daniels SR, Arnett DK, Eckel RH, Gidding SS, Hayman LL, Kumanyika S, et al. *Overweight in children and adolescents: pathophysiology, consequences, prevention, and treatment.* *Circulation.* 2005;111:1999-2012.
12. Mossberg HO. *40-year follow-up of overweight children.* *Lancet.* 1989;2:491-3.
13. Must A, Jacques PF, Dallal GE, Bajema CJ, Dietz WH. *Long-term morbidity and mortality of overweight adolescents. A follow-up of the Harvard Growth Study of 1922 to 1935.* *N Engl J Med.* 1992;327:1350-5.
14. Power C, Lake JK, Cole TJ. *Measurement and long term health risks of child and adolescent fatness.* *Int J Obes Relat Metab Disord.* 1997;21:507-26.
15. Freedman DS, Dietz WH, Srinivasan SR, Berenson GS. *The relation of overweight to cardiovascular risk factors among children and adolescents: The Bogalusa Heart Study.* *Pediatrics.* 1999;103:1175-82.
16. Wang G, Dietz WH. *Economic burden of obesity in youths aged 6 to 17 years: 1979-1999.* *Pediatrics.* 2002;109:E81-1.
17. Kiess W, Reich A, Müller G, Meyer K, Galler A, Bennek J, et al. *Clinical aspects of obesity in childhood and adolescence-diagnosis, treatment and prevention.* *Int J Obes Relat Metab Disord.* 2001;25 Suppl 1:S75-9.
18. Lindsay AC, Sussner KM, Kim J, Gortmaker S. *The role of parents in preventing childhood obesity.* *Future Child.* 2006;16:169-86.
19. Baughcum AE, Chamberlin LA, Deeks CM, Powers SW, Whitaker RC. *Maternal perceptions of overweight preschool children.* *Pediatrics.* 2000;106:1380-6.
20. Jain A, Sherman SN, Chamberlain LA, Carter Y, Powers SW, Whitaker RC. *Why don't low-income mothers worry about their preschoolers being overweight?* *Pediatrics.* 2001;107:1138-46.
21. He M, Evans A. *Are parents aware that their children are overweight or obese? Do they care?* *Can Fam Physician.* 2007;53:1493-9.
22. Myers S, Vargas Z. *Parental perceptions of the preschool obese child.* *Pediatr Nurs.* 2000;26:23-30.
23. Golan M. *Parents as agents of change in childhood obesity-from research to practice.* *Int J Pediatr Obes.* 2006;1:66-76.
24. Faul F, Erdfelder E, Lang AG, Buchner A. *G\*Power 3: A flexible statistical power analysis program for the social, behavioral, and biomedical sciences.* *Behav Res Methods.* 2007;39:175-91.
25. Pocock M, Trivedi D, Wills W, Bunn F, Magnusson J. *Parental perceptions regarding healthy behaviours for preventing overweight and obesity in young children: a systematic review of qualitative studies.* *Obes Rev.* 2010;11:338-53.
26. Genovesi S, Giussani M, Faini A, Vigorita F, Pieruzzi F, Strepparava MG, et al. *Maternal perception of excess weight in children: a survey conducted by paediatricians in the province of Milan.* *Acta Paediatr.* 2005;94:747-52.
27. Vuorela N, Saha MT, Salo MK. *Parents underestimate their child's overweight.* *Acta Paediatr.* 2010;99:1374-9.
28. Shelton D, Le Gros K, Norton L, Stanton-Cook S, Morgan J, Masterman P. *Randomised controlled trial: A parent-based group education programme for overweight children.* *J Paediatr Child Health.* 2007;43:799-805.

Correspondence:  
Amir H. Pakpour  
Department of Public Health,  
Qazvin University of Medical Sciences  
Qazvin - Iran  
Tel.: +98 (281) 333.8127  
Fax: +98 (281) 334.5862  
E-mail: pakpour\_amir@yahoo.com