

## Original

# Association between maternal perceptions and actual nutritional status for children in a study group in Mexico

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### Abstract

**Background:** Mexico has the highest rates of childhood obesity of any country in the world. As an environmental risk factor, family perception and behavior concerning child obesity is thought to have an important influence on the prevention and treatment of obesity.

**Objective:** the aim of this study was to evaluate maternal perceptions of children's weight and to determine whether these perceptions are associated with the actual weight of the children.

**Methods:** A descriptive study was conducted that assessed 273 children and included interviews with their mothers. Maternal perceptions of the children's weight status were compared with the measured weights, statures and body mass indices (BMI).

**Results:** The mean BMIs of the children and mothers were  $18.1 \pm 3.6$  and  $27.7 \pm 4.7$  kg/m<sup>2</sup>, respectively. The perceptions of mothers of children's weight are not associated with actual BMI category of children ( $p < 0.0001$ ). We found 74 children who were overweight and obese (27%); 62.2% of the mothers of these children considered them to be overweight and obese and 37.8% of these mothers felt that their sons were of normal weight when in fact they were overweight ( $p = 0.038$ ).

**Conclusions:** We found no association between actual BMI category of children and their mother's perceptions of their weight. In addition, found that third of mothers with obese or overweight children reported that their children had a normal nutritional status.

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Key words: Maternal perception. Children. Overweight. Obesity. Nutritional status.

### ASOCIACIÓN ENTRE LA PERCEPCIÓN MATERNA Y EL ESTADO NUTRICIONAL REAL DE LOS NIÑOS EN UN GRUPO DE ESTUDIO EN MÉXICO

### Resumen

**Antecedentes:** México tiene una alta prevalencia de obesidad infantil incluso colocándolo en el primer lugar a nivel mundial. Como un factor de riesgo ambiental, la percepción de la familia y el comportamiento relativo a la obesidad infantil se cree que tiene una influencia importante en la prevención y el tratamiento de la obesidad.

**Métodos:** Estudio descriptivo mediante el que se evaluaron 273 niños y se realizaron entrevistas con sus madres. La percepción materna del estado de nutrición o el peso de los niños se compararon con los pesos medidos, tallas e índices de masa corporal (IMC).

**Resultados:** El IMC promedio de los niños y las madres fueron  $18,1 \pm 3,6$  y  $27,7 \pm 4,75$  kg/m<sup>2</sup>, respectivamente. Las percepciones de las madres acerca del peso de los niños no se correlacionaron con la categoría real del IMC de los niños ( $p < 0,0001$ ). Se encontraron 74 niños (27%) con sobrepeso y obesidad; 62,2% de las madres de estos niños les consideró en la categoría correcta al mencionar que los percibían con sobrepeso y obesidad y 37,8% de estas madres percibieron, que sus hijos tenían un peso normal cuando en realidad tenían sobrepeso ( $p = 0,038$ ).

**Conclusiones:** No se encontró asociación entre la categoría del IMC de los niños y las percepciones de la madre. Además, la tercera parte de las madres con niños obesos o con sobrepeso informaron que sus hijos tenían un estado nutricional normal.

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Palabras clave: Percepción materna. Niños. Sobrepeso. Obesidad. Estado nutricional.

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## Abbreviations

BMI: Body mass indices.

CDC: The Centers for Disease Control and Prevention.

## Introduction

Obesity is considered to be a chronic and epidemic disease. Worldwide, it is estimated that 17.6 million children under five years of age are obese.<sup>1</sup> The incidence of childhood obesity continues to increase in Mexico and other countries.<sup>2</sup> According to the National Health and Nutrition Survey, 2006, obesity in five- to eleven-year-old children in Mexico increased by 47% and 77% from 1999 to 2006 in girls and boys, respectively. During this time, rates of overweight and obese children increased by 30%.<sup>3</sup> These statistics clearly indicate the urgency for applying policies that prevent obesity in children.<sup>4</sup>

Although risk factors are difficult to identify, 17 to 20% of conditioning factors that lead to the development of obesity in pediatric ages are thought to be environmental.<sup>5-7</sup> These factors include maternal perceptions about children's nutritional status,<sup>8-10</sup> which were found to represent 10.5 to 79% of the risk in different studies.<sup>11-14</sup> For these reasons, finding a relationship between parents' perceptions of their children's nutritional status and obesity in children will be useful in preventing overfeeding and obesity. Because family influences are fundamental to the prevention and treatment of obesity, knowing the parents' perceptions of their children's weight and the relationship between the perceived and actual weight is crucial. Thus, the aim of the present study was to evaluate maternal perceptions of children's weight and to determine whether these perceptions are associated the actual weight of the children.

## Materials and methods

A transversal and descriptive study was carried out at the Children's Hospital of the Central Region of Mexico (Tlaxcala), children between the ages of two and fifteen years who had no chronic pathologies that altered their nutritional status. Mothers' perceptions of their children's weight were assessed using a two-question questionnaire: the first question was: Your children's weight is: normal or not normal; and the second question was Your children's weight is: normal, overweight or obese. Additionally, weight and height data were registered by standardized nutritionist Seca Cuadra 808 scales were used to measure the weights of the children, and height measurements were achieved using a stadimeter (Seca 220, 1 mm dimension). Body mass indices (BMI) were calculated along with BMI percentiles, which were graphed over the percentiles

described by the Centers for Disease Control and Prevention (CDC) using sex-differentiated graphs for children between the ages of two and twenty years.

All subjects were informed about the protocol, and written informed consent was obtained from the participants. The study protocol was approved by the Committee of Studies in Humans at the Children's Hospital of the Central Region of Mexico (Tlaxcala).

## Statistical analysis

Patients were divided in three groups, established according to the BMI percentiles of the children. Patients with BMI percentiles less than 85 were included in group 1. Group 2 included patients with BMI percentiles between 85 and 94.9, group 3 covered BMI percentiles higher than 95. Also, patients were divided into two groups depending on whether their BMI percentiles were normal (percentiles < 85) or BMI percentiles higher than 85.<sup>15</sup> The sample size was calculated for a national childhood obesity prevalence of 27% (3) with a confidence level of 95%, a standard error of 5% and an accuracy level of  $\pm 5$ . Data were analyzed using SPSS software, version 10.0, for Windows (SPSS Inc, Chicago, IL). Continuous variables were expressed as the means  $\pm$  standard deviations (SD), and dichotomous and nominal variables were expressed as frequencies and percentages. Chi-squared tests were used to compare nominal variables and the Kappa Index was calculated to evaluate the concordance between maternal perceptions of children's weight and the actual BMIs of the children.  $p < 0.05$  was considered to be statistically significant.

## Results

We included 273 children, of which 43.2% ( $n = 118$ ) were female and 56.8% were ( $n = 155$ ) male. The mean age of the study subjects was  $8.52 \pm 4.12$  years, the mean weight was  $31.6 \pm 16.1$  kg, and the mean height was  $1.27 \pm 0.22$  m, resulting in a mean BMI of  $18.1 \pm 3.6$  kg/m<sup>2</sup>. There were no differences between boys and girls within any of the weight categories. The mean weight, height and BMI of the mothers were  $67.2 \pm 12.8$  kg,  $1.55 \pm 7.5$  m, and  $27.7 \pm 4.75$  kg/m<sup>2</sup>, respectively. We found that 27.2% ( $n = 74$ ) of the children were either overweight (BMI percentile > 85;  $n = 42$ ) or obese (BMI percentile > 95;  $n = 32$ ). Of these 74 patients, 48.6% were female ( $n = 36$ ) and 51.4% were male ( $n = 38$ ), while the mean age was  $9.5 \pm 3.4$  years and the mean BMI was  $22.1 \pm 3.6$  kg/m<sup>2</sup>. Mothers of overweight children had higher BMI values than mothers of children with lower weights ( $p = 0.038$ ).

Comparisons between mothers' perceptions of their children's weight and the measured BMI status of the children are shown in figure 1 and tabla I, BMI categories were compared with the percentiles and mater-

nal perceptions of children's nutritional status using the second question of the inquiry presented. No association was observed between the children's BMI and the maternal perception of the children (Kappa index = 0.164). Seventy-eight percent of the mothers correctly classified their children, but 21.6% of the mothers did not recognize their child's actual BMI. On the other hand, 37.8% of mothers with overweight and obese children according to the BMI percentile felt that their children had an adequate weight.

How much the children ate, we found an association between maternal perceptions of increased food intake and overweight and obese children ( $p < 0.0001$ ).

## Discussion

Maternal perceptions and family environments are considered to be important risk factors for the development of obesity in children. We evaluated the perceptions of mothers regarding the weight of their children and assessed whether these perceptions were correlated with the actual weights of the children. We found that third of the mothers failed to correctly classify their overweight child as being overweight or obese. This may reflect a failure of the mothers to recognize that their child is overweight or obese, a reluctance of the mothers to admit that their child is overweight or obese, or a lack of understanding of the exact meaning of the terms "overweight" or "obese". This percentage of misclassifications was higher than the percentages reported in other studies.<sup>11,16-19</sup> The differences between findings may be attributed to differences in sampling, the types of indices used to define the weight status, the BMI-for-age percentile selected to define levels of weight status, the terminology used to describe the weight status, and the age range of children studied.

Results from the present study are relevant to proposed public health strategies in obesity prevention programs. However, possible public health positive effects unlikely to occur if mothers do not recognize that their children are overweight. Therefore, pediatricians should evaluate mothers' capacities to acknowledge that their children are overweight before giving dietary advice. Maternal recognition of children's obesity has a positive effect on the children's life styles by affecting food consumption patterns, promoting nutritional education and stimulating physical activity.<sup>12,20,21</sup> It is therefore very important to provide mothers with a multidisciplinary education (nutritional, psychological and social) to produce a healthy mother-child relationship in relation to body weight.<sup>11</sup>

Mothers who are familiar with the impacts of childhood obesity are good mediators in the prevention of this disease, as they play a role in the meal plans and physical activity patterns of children. Family co-operation is the most important element in the treatment of childhood obesity and the affected child cannot be treated if the parents are not aware of the consequences

of being overweight and obese. A child's diet cannot change or improve if the rest of the family continues to maintain the same dietary habits.<sup>22</sup>

Finally, evaluating mothers' perceptions of their children's nutritional status will promote early intervention in the children's eating habits, allowing obesity to be prevented rather than treated once it has already been established.

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## References

1. Organization WH. Global strategy on diet, physical activity and Health. In. Geneva: 2003.
2. Ogden CL, Carroll MD, Flegal KM. Epidemiologic trends in overweight and obesity. *Endocrinol Metab Clin North Am* 2003; 32 (4): 741-760.
3. Shamah-Levy TV-H, Rivera-Dommarco JA. Resultados de Nutrición de la ENSANUT 2006. In. Edited by Pública INdS. Cuernavaca, México: 2007.
4. Tojo Sierra R, Leis Trabazo R. Obesity, an emerging problem in pediatrics. Inaugural Conference of the Eight National Congress of the Nutrition Spanish Society, Murcia, October 24-27, 2001. *Nutr Hosp* 2002; 17 (2): 75-79.
5. Faith MS, Rhea SA, Corley RP, Hewitt JK. Genetic and shared environmental influences on children's 24-h food and beverage intake: sex differences at age 7 y. *Am J Clin Nutr* 2008; 87 (4): 903-911.
6. Jiménez-Cruz A, Wojcicki JM, Bacardí-Gascón M, Castellón-Zaragoza A, García-Gallardo JL, Schwartz N, Heyman MB. Maternal BMI and migration status as predictors of childhood obesity in Mexico. *Nutr Hosp* 26 (1): 187-193.
7. Rodríguez-Rodríguez E, Aparicio A, López-Sobaler AM, Ortega RM: Body weight perception and dieting behaviour in Spanish population. *Nutr Hosp* 2009; 24 (5): 580-587.
8. Kain JC, Vio M. Validacion y aplicacion de instrumentos para evaluar intervenciones educativas en obesidad de escolares. *Rev Chil Pediatr* 2001; 72: 308-318.
9. Cutting TM, Fisher JO, Grimm-Thomas K, Birch LL. Like mother, like daughter: familial patterns of overweight are mediated by mothers' dietary disinhibition. *Am J Clin Nutr* 1999; 69 (4): 608-613.
10. Whitaker RC, Wright JA, Pepe MS, Seidel KD, Dietz WH. Predicting obesity in young adulthood from childhood and parental obesity. *N Engl J Med* 1997; 337 (13): 869-873.
11. Baughcum AE, Chamberlin LA, Deeks CM, Powers SW, Whitaker RC. Maternal perceptions of overweight preschool children. *Pediatrics* 2000; 106 (6): 1380-1386.
12. Maynard LM, Galuska DA, Blanck HM, Serdula MK. Maternal perceptions of weight status of children. *Pediatrics* 2003; 111 (5 Part 2): 1226-1231.
13. Jain A, Sherman SN, Chamberlin LA, Carter Y, Powers SW, Whitaker RC. Why don't low-income mothers worry about their preschoolers being overweight? *Pediatrics* 2001; 107 (5): 1138-1146.
14. Etelson D, Brand DA, Patrick PA, Shirali A. Childhood obesity: do parents recognize this health risk? *Obes Res* 2003; 11 (11): 1362-1368.
15. Kuczmarski RJ OC, Guo SS et al. CDC growth charts for the United States: Methods and development. National Center for Health Statistics. *Vital Health Stat* 2000; 11 (246): 2002.

16. Jackson J, Strauss CC, Lee AA, Hunter K. Parents' accuracy in estimating child weight status. *Addict Behav* 1990; 15 (1): 65-68.
17. Young-Hyman D, Herman LJ, Scott DL, Schlundt DG. Care giver perception of children's obesity-related health risk: a study of African American families. *Obes Res* 2000; 8 (3): 241-248.
18. Hackie M, Bowles CL: Maternal perception of their overweight children. *Public Health Nurs* 2007; 24 (6): 538-546.
19. Rosas LG, Harley KG, Guendelman S, Fernald LC, Mejia F, Eskenazi B. Maternal Perception of Child Weight Among Mexicans in California and Mexico. *Matern Child Health J* 2009.
20. Gualdi-Russo EAA, Argnani L, Celenza F, Nicolucci M, Toselli S. Weight status and body image perception in italian children. *Hum Nutr Diet* 2008; 21 (1): 39-45.
21. Villagrán Pérez S, Rodríguez-Martín A, Novalbos Ruiz JP, Martínez Nieto JM, Lechuga Campoy JL. Habits and lifestyles modifiable in children with overweight and obesity. *Nutr Hosp* 25 (5): 823-831.
22. Navia B, Ortega RM, Rodríguez-Rodríguez E, Aparicio A, Perea JM. Mother's age as a conditioning factor of food consumption and energy and nutrients intake of their offspring at pre-school age. *Nutr Hosp* 2009; 24 (4): 452-458.