



## Maternal perception of their child's nutritional status at less than three years old\*

Percepção materna do estado nutricional de seus filhos menores de três anos

Percepción materna del estado nutricional de sus hijos menores de tres años

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### ABSTRACT

**Objective:** Assessing maternal perception of their children's nutritional status and identifying associated factors. **Methods:** A cross-sectional study conducted in a small municipality with 342 children less than 3 years of age treated in Basic Health Units of São Paulo. Nutritional status was classified in percentiles of body mass index for age and maternal perception was assessed using the scale of verbal descriptors (very thin, thin, healthy weight, fat, very fat). Logistic regression was used to identify the associated factors. **Results:** 44.7% of maternal perception was found to be inadequate. Mothers of overweight (OR = 11.8, 95% CI: 6.4-21.7) and underweight (OR = 5.5; 95% CI: 1.9-16.2) children had a higher chance of having inadequate perception, similar to mothers of children over 24 months of age (OR = 2.9; 95% CI: 1.4-6.0). **Conclusion:** For effective child care in primary care, healthcare professionals should consider maternal perception and help mothers to identify the nutritional status of children in childcare consultations and growth monitoring.

### DESCRIPTORS

Child; Nutritional Status; Obesity; Mothers; Perception; Public Health Nursing.

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## INTRODUCTION

Theoretically at a biological level, adequate nutritional status (eutrophic) results from the balance between food intake and organic nutrition needs at each stage of life. Imbalances in this relationship are manifested as nutritional deficiencies (when there are general or specific energy and nutrient deficiencies) or nutritional disorders (caused by scarcity or excess of food leading to malnutrition or obesity)<sup>(1)</sup>.

Children have an accelerated growth process up to 5 years old, making this period vulnerable to the occurrence of nutritional problems. Thus, evaluating and monitoring growth and development should be the central axis of attention given to the child in all basic health service networks<sup>(2-3)</sup>. This nutrition monitoring aims to promote and protect children from the adverse effects that inadequate nutritional status (malnutrition or overnutrition) can cause to the current and future health of children<sup>(4)</sup>.

In this context, maternal perception of nutritional status is essential for prevention and treatment of nutritional disorders, as is the acknowledgment of an altered nutritional status that generates health concern and represents the first step in searching for health attention and health-care<sup>(5)</sup>. Furthermore, there has been evidence that mothers can stimulate or restrict feeding their children depending on their perception of their nutritional status<sup>(6)</sup>.

Several studies that address maternal perception of their children's nutritional status show that the mothers present difficulty in recognizing the nutritional status, especially in cases of overweight or obesity<sup>(5,7-8)</sup>, when they tend to underestimate excess weight<sup>(7)</sup>. There is also evidence that the perception is more common among mothers who are overweight<sup>(9-10)</sup>, have low education levels<sup>(10-11)</sup>, mothers of males<sup>(12)</sup> and younger children<sup>(13)</sup>.

In Brazil, this subject has been addressed in systematic reviews of literature<sup>(5,8,14)</sup>, although population studies are scarce<sup>(15-17)</sup>, which justified the present study design. Thus, the objective of this study was to assess the maternal perception of their children's nutritional status in a sample of children less than 3 years of age served in basic health units, and identify the variables associated with maternal perception of inadequacy.

Based on the literature, the study hypotheses were defined as: a) mothers of children with low birth weight, a risk of being overweight or obese, and having an inadequate perception of the nutritional status of their child compared to the mothers of children with appropriate weight; b) inadequate maternal perception is associated to children's and maternal characteristics.

## METHOD

This cross-sectional study is a subproject of a broader investigation approved by the Research Ethics Committee (Case No. 193468) meeting the ethical principles in accordance with Resolution No. 196/96 of the National Health Council, to assess growth, development and nutrition of children less than 3 years of age, and registered in Basic Health Units (BHU) in a small city/municipality in the State of Sao Paulo.

The sample size was calculated using the Epi-info software, considering  $p = 50\%$  (requirement of the broader project); from a population of 3,904 children under 3 years of age enrolled in 12 BHUs of the municipality, a confidence level of 95% and margin of error of 5%. The sample of 350 children was representative, stratified and proportional to the number of children enrolled in each BHU.

Data collection was conducted from February to April 2013 from Monday to Friday by 11 properly trained nurses and one nursing graduate student. All mothers of children less than 3 years of age registered at the BHU who attended the health service in the data collection period were invited to participate. All children up to 2 years, 11 months and 29 days enrolled in one of the 12 BHUs who attended the health service with the biological mother during the data collection period were included in the sample.

Exclusion criteria were being twins, having neurological problems or special needs due to the greater likelihood of changes in the nutritional status.

Of the 399 mothers approached, 35 refused to participate in the study, one child did not fit the inclusion criteria (she was not a biological daughter) and five were excluded (two with neurological problems and three twins). From the 358 eligible children, there were 16 losses due to inadequate collection of anthropometric data that could not be recovered. Thus, the study sample consisted of 342 children and their respective mothers.

The mothers were initially interviewed using proper pre-tested forms which included information regarding the child (age, gender, birth weight, child care check-ups/consultations and whether the health professional had informed them about the nutritional status of their child) and the mother (age and education level).

Next, anthropometric measurements of children and their mothers were obtained. Weight and height of children were verified according to the techniques recommended by the Ministry of Health<sup>(18)</sup>. In children under 2 years of age, a Welmy digital pediatric scale and wood anthropometer were used to evaluate weight and height, respectively. In children of 2 to 3 years, weight and height were verified using a Welmy platform scale coupled with an anthropometer. For assessing the nutritional status of children, Body Mass Index (BMI) was used for age in percentiles obtained using the WHO Anthro version 3.2.2 program from the World Health Organization<sup>(19)</sup>.

We chose to use the BMI for age to assess the nutritional status given that such a parameter shows whether the child is under or over the expected weight for their height and age<sup>(3)</sup>, as categorized into: severely thin = percentile  $< 0.1$ ; thin = percentile  $\geq 0.1$  and  $< 3$ ; healthy weight = percentile  $\geq 3$  and  $\leq 85$ ; risk of overweight = percentile  $> 85$  and  $\leq 97$ ; overweight = percentile  $> 97$  and  $\leq 99.9$ ; and obese = percentile  $> 99.9$ <sup>(18)</sup>.

For univariate and logistic regression analysis, the variables generated: "Underweight", which includes the categories thin and severely thin, and "Overweight", which brings together the categories risk of overweight, overweight and obese, so that these analyzes are considered three

categories of nutritional status: underweight, healthy weight and overweight.

Regarding the mothers, weight and height were also verified on a Welmy platform type scale coupled with anthropometer. Nutritional status was classified according to cutoff points recommended for BMI into: underweight (BMI <18.5 kg/m<sup>2</sup>); adequate weight/eutrophic (BMI ≥ 18.5 and <25 kg/m<sup>2</sup>); overweight (BMI ≥ 25 and <30 kg/m<sup>2</sup>); and obesity (BMI ≥ 30 kg/m<sup>2</sup>)<sup>(18)</sup>.

The dependent variable was the mother's perception of their child's nutritional status assessed through a scale of verbal descriptors, according to the following expressions: "very thin", "thin", "healthy weight", "fat" and "very fat". The mother was asked which descriptor best represented the nutritional status of the child. Maternal perception was obtained by comparing the verbal descriptor used by the mother with the child's nutritional status. The perception was considered appropriate if it corresponded to the percentile of the children's nutritional status: "very thin" = percentile <0.1 (Severely thin); "thin" = percentile ≥ 0.1 and <3 (Thin); "healthy weight" = percentile ≥ 3 and ≤ 85 (Adequate weight/eutrophic); "Fat" = percentile > 85 and ≤ 99.9 (Risk of overweight and Overweight); "very fat" = percentile > 99.9 (Obese); and *inadequate* perception, when the verbal descriptor used differed from the percentile of the children's nutritional status. In this case, it was considered that the mother *underestimated* (used a verbal descriptor lower than the percentile of nutritional status) or *overestimated* the nutritional status of the child (used a verbal descriptor greater than the percentile of nutritional status).

The database was built in the Epi-Info version 3.5.1 software and checked for double entry and analyzes were performed using Stata version 13.1. Chi-square test was used for univariate and logistic regression associations to assess the factors associated with inadequate maternal perception of their child's nutritional status. Maternal perception was considered dichotomous (adequate maternal perception = 0 and inadequate maternal perception = 1). Variables with  $p < 0.20$  in the univariate analysis were included in the multiple logistic regression model, and was adjusted for maternal education level. A 5% significance level was considered statistically significant for the final model.

## RESULTS

### INFANT/CHILDREN AND MATERNAL CHARACTERISTICS

Most of the children were under 1 year of age (59.1%) and were male (55.0%). Approximately 90.0% of the children were born weighing more than 2,500 grams, they were attended to with childcare consultations and mothers reported that the professionals had informed them about the child's nutritional status. Risk of overweight and overweight/obesity affected 21.0% and 7.9% of children, respectively. The mothers had a mean age of 27 years (SD = 6.7), average education of 10 years (SD = 3.2), while 30.5% were overweight and 23.6% were obese (Table 1).

**Table 1** – Child and maternal characteristics from a small municipality – São Paulo, SP, Brazil, 2013.

Characteristics	n	%
<b>Children</b>		
Age (months): mean (SD)		12.0 (9.6)
< 12	202	59.1
12 to 24	88	25.7
≥ 24	52	15.2
Gender		
Male	188	55.0
Female	154	45.0
Birth weight (grams)		
< 2500	41	12.0
≥ 2500	301	88.0
Childcare consultations <sup>†</sup>		
Yes	298	91.7
No	27	8.3
Healthcare professionals informed the nutritional status of the child <sup>†</sup>		
Yes	272	89.5
No	32	10.5
Nutritional status		
Severely thin	4	1.2
Thin	13	3.8
Healthy weight	226	66.1
Risk of overweight	72	21.0
Overweight	18	5.3
Obese	9	2.6
<b>Mothers*</b>		
Age (years): mean (SD)		27.0 (6.7)
Education level (years of schooling): mean (SD)		10.0 (3.2)
Nutritional status		
Eutrophic	146	43.2
Underweight	9	2.7
Overweight	103	30.5
Obese	80	23.6

\* Information were not obtained for the whole sample.

### MATERNAL PERCEPTION OF THE NUTRITIONAL STATUS OF

#### THE CHILD

In total in the last column of figure 1, it is noted that more than two thirds of mothers (69.6%) mentioned the verbal descriptor "healthy weight" to define the nutritional status of the child, while the same proportion (15.2%) of descriptors were related to thinness ("very thin": 1.5% and "thin": 13.7%) and overweight ("fat": 14.6% and "very fat": 0.6%) (Figure 1).

Almost half of the mothers (44.7%) had an inadequate perception of the nutritional status of the child. Among these, 34.2% underestimated the nutritional status of the child, especially mothers of children at risk of overweight (77.8%) and overweight/obese (85.2%). Mothers of underweight children, in turn, reported a verbal descriptor that overestimated the nutritional status of the child (58.8%) (Table 2).

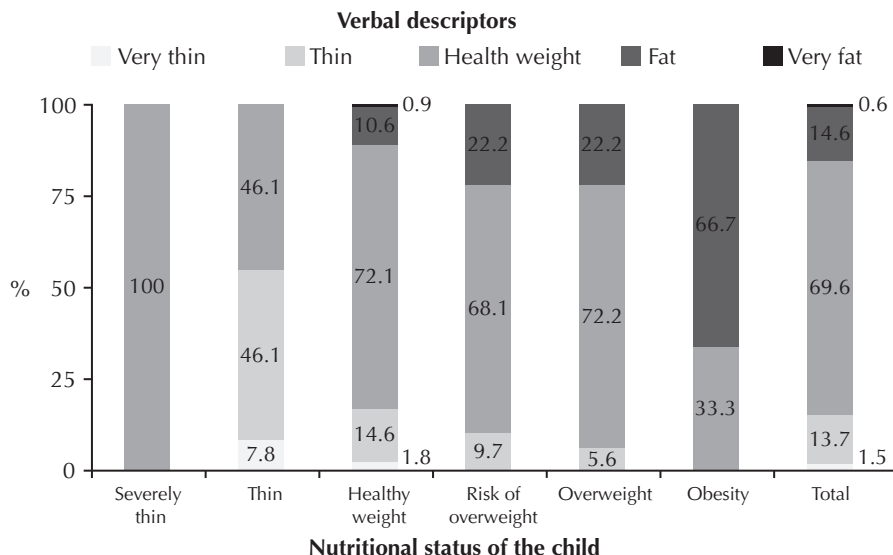


Figure 1 – Verbal descriptors used by the mother distributed according to the nutritional status of the child of a small municipality – São Paulo, SP, Brazil, 2013.

Table 2 – Maternal perception, according to the nutritional status of the child of a small municipality – São Paulo, SP, Brazil, 2013.

Maternal perception*	Nutritional status of the child								Total	
	Severely thin/Thin		Healthy weight		Risk of overweight		Overweight/Obese		n	%
	n	%	N	%	n	%	n	%		
Total	17	100.0	226	100.0	72	100.0	27	100.0	342	100.0
Adequate	6	35.3	163	72.1	16	22.2	41	14.8	189	55.3
Inadequate	11	64.7	63	27.9	56	77.8	23	85.2	153	44.7
Underestimated	1	5.9	37	16.4	56	77.8	23	85.2	117	34.2
Overestimated	10	58.8	26	11.5	-	-	-	-	36	10.5

\* Chi-square test between adequate and inadequate maternal perception: p < 0.01.

**FACTORS ASSOCIATED WITH INADEQUATE MATERNAL PERCEPTION OF THE NUTRITIONAL STATUS OF THEIR CHILD**

Table 3 highlights the inadequate maternal perception of the nutritional status of the child according to child and maternal characteristics. Univariate analysis showed the associated variables (p < 0.20): age, gender, birth weight and nutritional status of the child. Among mothers of children aged 12 to 24 months, 58.0% had an inadequate perception of the nutritional status of the child, while this percentage was only 36.1% among mothers of children less than one year old. Regarding gender, half of the mothers of girls and less than 40.0% of mothers of boys had an inadequate

perception. It is noteworthy that almost 80.0% of mothers of overweight children had an inadequate perception, whereas this percentage was only 27.9% among mothers of children with a healthy weight.

In the final model of multiple logistic regression, the child's age and nutritional status remained associated. Mothers of overweight (OR = 11.8, 95% CI: 6.4-21.7) and underweight (OR = 5.5; 95% CI: 1.9-16.2) children were more likely to have an inadequate perception of the nutritional status of the child, similar to mothers of children between 12 and 24 months of age (OR = 2.4; 95% CI: 1.3-4.5), and older than 24 months (OR = 2, 9; 95% CI: 1.4-6.0) (Table 3).

Table 3 – Univariate and multiple analyzes of inadequate maternal perception of the nutritional status of their child and associated factors of a small municipality – São Paulo, SP, Brazil, in 2013.

Characteristics	Inadequate maternal perception n = 153		Univariate		Multiple*	
	n	%	OR <sub>gross</sub>	CI <sub>95%</sub>	OR <sub>adjusted</sub>	CI <sub>95%</sub>
<i>Children</i>						
Age (months)						
< 12	73	36.1	1.0	-	1.0	-
12 to 24	51	58.0	2.4	1.5-4.1 <sup>†</sup>	2.4	1.3-4.5 <sup>†</sup>
≥ 24	29	55.8	2.2	1.2-4.1 <sup>†</sup>	2.9	1.4-6.0 <sup>†</sup>

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Characteristics	Inadequate maternal perception n = 153		Univariate		Multiple*	
	n	%	OR <sub>gross</sub>	CI <sub>95%</sub>	OR <sub>adjusted</sub>	CI <sub>95%</sub>
Gender						
Male	75	39.9	1.0	–	1.0	–
Female	78	50.7	1.5	1.0-2.4 <sup>†</sup>	1.7	1.0-2.9 <sup>‡</sup>
Birth weight (grams)						
< 2500	23	56.1	1.0	–	1.0	–
≥ 2500	130	43.2	0.6	0.3-1.1 <sup>†</sup>	0.7	0.3-1.5
Childcare consultations						
Yes	134	45.0	1.1	0.3-1.7	–	–
No	14	51.8	1.0	–	–	–
Professional reports on the nutritional status of the child						
Yes	126	46.3	1.4	0.7-3.0	–	–
No	12	37.5	1.0	–	–	–
Nutritional status						
Healthy weight	63	27.9	1.0	–	1.0	–
Underweight <sup>§</sup>	11	64.7	4.7	1.7-13.4 <sup>†</sup>	5.5	1.9-16.2 <sup>‡</sup>
Overweight <sup>  </sup>	79	79.8	10.2	5.8-18.1 <sup>†</sup>	11.8	6.4-21.7 <sup>‡</sup>
<i>Mothers</i>						
Age (years)						
< 20	20	48.8	1.0	–	–	–
20 to 25	37	42.1	0.8	0.4-1.6	–	–
≥ 25	92	46.0	0.9	0.5-1.7	–	–
Education level (years of schooling)						
≤ 8	51	44.4	1.0	–	–	–
> 8	102	45.5	1.0	0.7-1.6	–	–
Nutritional status						
Eutrophic + underweight	66	42.6	1.0	–	–	–
Overweight	44	42.7	1.0	0.6-1.7	–	–
Obese	42	52.5	1.5	0.9-2.6	–	–

\*Model adjusted for maternal education level †p < 0.20. ‡p < 0.05. § Severely thin and thin. ||Risk of overweight, overweight and obese.

## DISCUSSION

The results showed that almost half of the mothers had a poor perception of the nutritional status of their child. Internationally, investigations with similar ages found lower proportions of inadequate maternal perception, ranging from 30.0% to 35.9%<sup>(10,20)</sup>. Also in Brazil, the proportions observed in previous studies are lower than in the present study; about 30.0% among mothers of children less than 2 years of age, registered in BHU of São Paulo<sup>(15)</sup>, and 18.9% among mothers of children attending nurseries in a southern city in the country<sup>(17)</sup>.

There is evidence that mothers with less education are those with more inadequate perception of the child's nutritional status<sup>(10-11)</sup>, but this finding was not observed in this study. However, what deserves attention is the high percentage of inadequate maternal perception found among mothers with an average of ten years of schooling. The increase in obesity worldwide could justify this result, as it makes the profile of excess weight common to the point of

distorting the normal range of nutritional status, thereby leading mothers to not notice their child's weight<sup>(21)</sup>.

Although controversial, there is evidence that parents who are overweight have more difficulty recognizing their own child's weight<sup>(14)</sup>. In a sample of 219 children aged 3 to 6, it was found that obese mothers were nearly three times more likely to not notice their child being overweight compared to mothers with a healthy weight<sup>(9)</sup>. In this study, more than half of the mothers were overweight or obese. So it is not surprising that a high proportion of mothers considered that their child had a "healthy weight", although excess weight (risk of overweight, overweight and obese) affects almost a third of children. This trend was also observed in another study in which 79.2% of parents considered their child to be a "healthy weight", despite a high percentage of overweight (38.0%) and underweight (5.0%) children of 2 to 5 years of age<sup>(20)</sup>.

Mothers of underweight children tended to overestimate the nutritional status of their child, whereas among the mothers of overweight children a trend of underestimation was found. This result reinforces the idea that maternal



perception is different depending on the nutritional status of the child<sup>(16-17)</sup>.

There are different body types, typical in different historical contexts, so that excess weight is influenced by social values that influence their perception and interpretation. Thus, maternal perception is influenced by what is defined as an overweight pattern in each society and in young children. In the case of this study, there is a historical appreciation of Johnson's Baby model, "a chubby baby", considered as being healthy and well-cared for or nurtured<sup>(22)</sup>.

In this discussion about the body beauty standards accepted by society, we highlight the association between the gender of the child and maternal perception of their nutritional status, as parents do not recognize overweight in boys and underweight in girls. This means that parents underestimate the weight of boys and overestimate the weight of girls<sup>(5,8,14)</sup>. Certainly this difference is related to gender category, being subject to what society determines as ideal for male and females, as girls are led to pursue and value thinness more than boys. Possibly gender category is not so relevant in a sample of younger children as in this study, and the mother's concern is still focused more on the child's health than appearance.

It was found that about 90% of the children were attended by childcare consultations, and according to mother's report, the health professional informed them about the child's nutritional status. Thus, one would expect a lower percentage of inadequate maternal perception of the nutritional status of children as there is evidence that parents had been informed about the nutritional status, which should tend towards having a more adequate perception<sup>(23)</sup>. It is worth noting that less than 9% of child health records had growth charts properly completed<sup>(24)</sup>; thus, most mothers did not have a visual representation of the nutritional status, which may have contributed to the high percentage of inadequate perception. This complicates the pursuit of prevention and treatment for appropriate nutritional conditions<sup>(25)</sup>; however, considering that the children studied were registered at a BHU, the inadequate perception could hinder the acceptance of the guidelines offered by health professionals.

The high percentages of inadequate maternal perception in this study, especially among mothers of overweight children, and in addition to the already proven link between inadequate maternal perception and less concern of parents with child nutritional status<sup>(26)</sup>, reinforce the need for health professionals to involve parents in their child's growth, being that they are the child's care protagonists<sup>(14)</sup>.

Moreover, there is still much to be done in order for the "concept of a 'chubby' child as being synonymous with healthy to be rebuilt"<sup>(1)</sup>. Implementing shared educational processes between health professionals and the family is

recommended in order to raise awareness of the need to monitor growth and guidelines to healthy eating practices.

It is worth mentioning the importance of health professionals engaging in monitoring child growth and informing parents about the nutritional status of their child, both during routine visits and at any opportunity that presents itself, either in the health facility, home visits or in collective spaces<sup>(26)</sup>. It is in this context in which nurses are inserted, it is their responsibility to provide care through nursing child care consultations and home visits, in addition to educational intervention groups which can contribute to demystifying concepts, promote healthy eating habits and prevent nutritional disorders<sup>(27)</sup>.

In the present study, the inclusion criteria that child was registered at one of the BHUs of the municipality to be part of the study population contributed to the sample being almost from same social group, an aspect that can be considered as a limitation. Thus, the results cannot be generalized to private health service users and health insurance, but only for children treated at BHUs in this region, as food, cultural habits and body patterns may be different depending on the region of the country. It is worth noting that the BHU coverage is considered high, especially among the child population<sup>(28)</sup>.

A second limitation would be the use of BMI for age in diagnosing overweight children, without considering other body fat measures<sup>(29)</sup>. However, the use of this anthropometric index allowed for comparing the results with national and international literature.

## CONCLUSION

More than two thirds of mothers believe that their child is at an "Adequate or healthy weight", regardless of nutritional status, and almost half have a poor perception of the nutritional status of their child. Among mothers with poor perception, most underestimate the nutritional status, especially if the child is overweight.

In addition to the nutritional status, the age of the child influences maternal perception, and mothers of older and overweight children have more chance of having an inadequate perception of the nutritional status of the child.

It is therefore essential that health professionals assess maternal perception of the nutritional status of their child and assist mothers in understanding the meaning of healthy weight. There also exists the importance of training professionals for the proper conduct of monitoring growth and to complete the growth charts in children's health records as they are often overlooked in child care. Lastly, there is a need for further qualitative research to investigate the reasons that lead mothers to have an inadequate perception of the nutritional status of their child.

## RESUMO

**Objetivo:** Avaliar a percepção materna do estado nutricional do filho e identificar os fatores associados. **Método:** Estudo transversal realizado em município de pequeno porte com 342 crianças menores de 3 anos atendidas em Unidades Básicas de Saúde do Estado de São Paulo. O estado nutricional foi classificado em percentis do Índice de Massa Corporal para Idade e a percepção materna foi avaliada com escala de descritores verbais (muito magro, magro, peso adequado, gordo, muito gordo). Utilizou-se de regressão logística para identificar os fatores associados. **Resultados:** Constatou-se 44,7% de percepção materna inadequada. Mães de crianças com excesso

de peso (OR=11,8; IC<sub>95%</sub>:6,4-21,7) e com baixo peso (OR=5,5; IC<sub>95%</sub>:1,9-16,2) apresentaram mais chance de percepção inadequada, da mesma forma que mães de crianças com mais de 24 meses de idade (OR=2,9; IC<sub>95%</sub>:1,4-6,0). **Conclusão:** Para uma efetiva assistência à criança na atenção básica, profissionais de saúde devem considerar a percepção materna e auxiliar as mães na identificação do estado nutricional do filho nas consultas de puericultura e acompanhamento do crescimento.

## DESCRIPTORIOS

Criança; Estado Nutricional; Obesidade; Mães; Percepção; Enfermagem em Saúde Pública.

## RESUMEN

**Objetivo:** Evaluar la percepción materna del estado nutricional del hijo e identificar los factores asociados. **Método:** Estudio transversal realizado en municipio de pequeño porte con 342 niños menores de 3 años atendidos en Unidades Básicas de Salud del Estado de São Paulo. El estado nutricional fue clasificado en percentiles del Índice de Masa Corpórea para Edad y la percepción materna fue evaluada con escala de descriptores verbales (muy delgado, delgado, peso adecuado, gordo, muy gordo). Se utilizó la regresión logística para identificar los factores asociados. **Resultados:** Se constató el 44,7% de percepción materna inadecuada. Madres de niños con exceso de peso (OR=11,8; IC<sub>95%</sub>:6,4-21,7) y con bajo peso (OR=5,5; IC<sub>95%</sub>:1,9-16,2) presentaron más probabilidad de percepción inadecuada, de la misma manera que madres de niños con más de 24 meses de edad (OR=2,9; IC<sub>95%</sub>:1,4-6,0). **Conclusión:** Para una efectiva asistencia al niño en la atención básica, profesionales sanitarios deben considerar la percepción materna y ayudar a las madres en la identificación del estado nutricional del hijo en las consultas de puericultura y seguimiento del crecimiento.

## DESCRIPTORIOS

Niño; Estado Nutricional; Obesidad; Madres; Percepción; Enfermería en Salud Pública.

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