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Perceptions and parenting practices associated with food consumption and nutritional status in preschool children

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Abstract

Understanding infant diet is of great importance to elucidate its determining factors. It is known that parents exert great influence on the formation of their children's eating behavior and are able to define their children's eating patterns at other moments in their future life cycles. However, the effects of parental practices and perceptions on the food consumption and nutritional status of their children need to be elucidated more clearly. This study aimed to verify the association of parental practices and perceptions with food consumption and nutritional status of children. This is a cross-sectional study, conducted with parents and children aged two to six years old. Questionnaires were applied using the Google Forms® platform to investigate parental practices and perceptions, sociodemographic data, weight and height, child food consumption, and family food routine. The instruments used in data collection were the Child Feeding Questionnaire, the Child Feeding Frequency Questionnaire, and the authors' own questions. For statistical analysis, $p<0.05$ was considered significant. Sixty-eight parents of children were interviewed, of which 89.7% were mothers and 72.1% worked outside the home. Among children, 54.4% were male and 60.3% eutrophic. Among those parents who worked outside the home, preschoolers had most of their meals at school. There was an association between the parents' perception of the child's weight and nutritional status, frequency of parental responsibility in deciding the right type of food with the child's nutritional status, and parents' education. Controlling the intake of sweets was associated with parental age. Snack consumption by children was associated with parental education. It was concluded that parental practices and perceptions were associated with the nutritional status of preschoolers, but there was no association with food consumption.

Palavras-chave: Feeding behavior. Nutritional status. Preschool. Parents. Family power.

INTRODUCTION

The study of childhood nutrition is of great importance for understanding the determinants of healthy development and eating behavior in preschool children. This can be directly influenced by the family context, availability of food at home[1] and shaped by food experiences and learning in early life[2]. Thus, parents play a fundamental role in food choice and in the formation of their children's eating behavior[1,3].

Parenting practices are behaviors performed by parents in order to educate and influence their children's behavior, attitudes and beliefs[4].

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It is important to identify which parenting practices and strategies positively contribute to the implementation of healthy eating habits in children and which practices should be discouraged[3,5].

Excess weight in childhood results from multiple factors, including inadequate eating habits and unhealthy lifestyle[6]. It is increasingly recognized that parenting practices, arising from their perception of their child's weight and food consumption, are an important factor for educational interventions to reduce the prevalence of overweight and obesity in childhood[7].

Given the influence that parental practices and perceptions can exert on the child's nutritional status and food consumption, developing studies that associate the factors with such parental behaviors may be a way to identify risk factors for nutritional health of preschoolers. In view of the above, the objective of the present study was to evaluate the association between parental practices and perceptions with food consumption and nutritional status of preschool children.

METODOLOGY

This was a cross-sectional study carried out in five private schools in Greater São Paulo, SP, with data collection from April to August 2020. After authorization from the co-participating institutions, the survey was disseminated to parents through an electronic message via WhatsApp, email, and online school agenda. All parents of children aged between two and six years old enrolled in the selected schools were invited to participate. The sample totaled 68 participants, parents of children aged 2 to 6 years, and was characterized as by convenience and non-probabilistic. Children with any disease that compromised food intake were not eligible. Parents answered the questions in the form of a questionnaire applied through the online platform Google Forms® and the link for filling it out was made available via WhatsApp and the online school agenda.

The questions about the sociodemographic characterization and aspects of the family's diet and eating routine were prepared by the authors of this study. The variables of interest to the parents were: age, education, marital status, relationship with the child (degree of kinship), work outside the home and for how many hours a day. Regarding the children, the following information was collected: sex, date of birth, age, weight, and height. Objective questions were also asked about the family's diet and food routine, such as: place where the child has meals and use of electronic devices (TV, cell phones, tablets, etc.) during meals.

Parenting perceptions and practices were assessed using the Child Feeding Questionnaire (QAC)[8], a translated and validated version in Brazil of the Child Feeding Questionnaire (CFQ)[9], an instrument that assesses aspects of child feeding, perception, attitudes, and practices and their relationship with diet, acceptance by parents, control of food intake, and propensity to obesity. This questionnaire has 31 questions and analyzes seven factors: four of them assess parents' perceptions and beliefs regarding control of childhood feeding practices, and three measure parental control practices and attitudes about the child's diet. The factors evaluated are divided into the following subscales: (i) “Perception of responsibility”, (ii) “Perception of the parents' weight”, (iii) “Perception of the child's weight”, (iv) “Concern about the child's weight”, (v) “Restriction”, (vi) “Pressure to eat”, and (vii) “Monitoring”. The questions were answered according to the intensity of perceptions and

attitudes, and for each of the answers there were always five options with scores ranging from one to five, measured using a Likert scale. The number of questions answered in the CWP factor (Child Weight Perception) varied according to the age group studied, for this reason questions 11, 12, and 13 contained in the original questionnaire were not used in this study.

Reported height and body weight were used to calculate the Body Mass Index (BMI). The child's nutritional status was assessed using the BMI z-score for age and classified according to the cutoff points recommended by the World Health Organization (WHO)[10,11] into seven categories: significant thinness, thinness, normal weight, risk of overweight, overweight, obesity, and severe obesity. The Who Anthro and Who Anthro Plus software were used to calculate the z-score.

To obtain the child's usual frequency of food consumption, the Children's Food Frequency Questionnaire (CFFQ) was applied, developed by Colucci, Slater and Philippi[12]. For the present study, we chose to investigate the frequency of consumption of the children on ordinary days, and only from the following food groups: snacks, sweets and treats, fruits, and vegetables. Each food group presented simple questions with multiple and objective answers, representing the frequencies of consumption: never, less than once a month, one to three times a month, two to four times a week, once a day, and two or more times.

We chose to stratify the response options for the following variables to facilitate the presentation of results: parents' education, preschool child's nutritional status, parents' perception of the child's weight, frequency of parental responsibility for deciding the correct type of food, control of sweets, and frequency of food consumption.

A descriptive data analysis was performed using mean and standard deviation for quantitative variables using measures of central tendency. Regarding the categorical variables, frequency measurements were used (absolute and relative). To verify the association between the variables of interest in the study, the Chi-Squared Test was used, and was considered significant when $p < 0.05$ or 5%.

RESULTS

As for the sociodemographic variables reported by the parents, it was observed that 77.94% were between 30 and 39 years old, 80.88% were married, 98.53% had completed high school/incomplete higher education/ completed higher education, and 89.71% of respondents were mothers (Table 1).

The children had a mean age of 3.47 ± 1.41 years old (33.82% aged 2 years old), with a higher proportion of males (54.41%). Regarding nutritional status, 60.29% were eutrophic (Table 1).

Regarding the family's food routine and diet, it was found that for most of the children evaluated, breakfast (72.06%), dinner (64.71%), and supper (91.18%) were performed at home or with family members. The morning snack (57.35%), lunch (54.41%) and afternoon snack (58.82%) were predominantly performed in the school environment. At home, preschoolers tend to have most of their meals in the living room (45.59%) (data not shown in the table).

Considering that 72.06% (n=49) of parents worked outside the home (Table 1), the following meals were eaten in the school environment by most children with a significant difference: lunch (86.49%) (p=0.004); afternoon snack (85.00%) (p=0.004); dinner (87.50%) (p=0.036) (data not shown in table). The use of electronic devices (tablets, cell phones, TV, etc.) was present during

meals in 64.71% of the sample (data not shown in the table).

Table 2 shows data on parents' perception of their children's weight and the categories of children's nutritional status. There was a significant association between these variables (p=0.013). Among those who perceived their child's weight as being "normal", 60.00% (n=30) were in fact eutrophic and 30% (n=15) were at "risk of overweight/overweight".

Table 3 presents the frequency of parents' perception of responsibility in deciding the correct type of food for their child and the child's nutritional status categories. There was a significant association between these variables. Among the parents who felt responsible for deciding "most of the time/always" the correct type of food for the child, 63.64% and 25.45% of the children were classified as "eutrophy" and as "risk of overweight/ overweight" (p=0.025), respectively.

There was also a significant association between the perception of responsibility for child's feeding and parents' schooling. All parents who felt responsible for deciding "most of the time/always" the correct type of food for their child had a "complete high school/incomplete higher education, or complete higher education" (p=0.036) (data not shown in the table).

It was also found that parents who had "complete high school/incomplete higher education" or "complete higher education" are those who offered their children "never/less than 1 time/month" snacks like pizza (44.78%), potato chips (55.22%), and sandwiches (59.70%) (p<0.05) (Table 4).

Regarding the control of sweets and age of the parents, there was a significant association, so that 61.76% (n=42) "agree/slightly agree" among which 88.10% (n=37) were between 30 and 39 years old (p= 0.023) (data not shown in the table).

Table 1 – Distribution in number (n) and percentage (%) of sociodemographic data on parents and children. Sao Paulo, 2020.

Sociodemographic data	n	%
Age of parents		
≥20<30 years	7	10.29
≥30<40 years	53	77.94
≥40<50 years	8	11.76
Marital status		
Married	55	80.88
Single	10	14.71
Divorced	3	4.41
Education		
Complete high school/incomplete high school; Graduated	67	98.53
Illiterate/Incomplete Elementary	1	1.47
Family member who answered the questionnaire		
Mother	61	89.71
Dad	7	10.29
Child's age		
2 years	23	33.82
3 years	17	25
4 years	10	14.71
5 years	9	13.24
6 years	9	13.24
Child's Gender		
Male	37	54.41
Female	31	45.59
Child's nutritional status		
Eutrophic	41	60.29
Risk of overweight/Overweight	17	25
Thinness /Significant thinness	6	8.82
Obesity/Severe obesity	4	5.88
Works away from home		
Yes	49	72.06
No	19	27.94
Hours/day work outside the home		
≥8 hours	43	63.24
<8 hours	25	36.76

Table 2 – Association between the interviewed parents' perception of their children's weight in the preschoolers and nutritional status. Sao Paulo, 2020.

Parents' perception of the child's weight in the preschool phase	Muito abaixo do peso/ abaixo do peso	Normal	Acima do peso/ muito acima do peso	Valor de p
Nutritional status	**n (%)**	**n (%)**	**n (%)**	
Thinness/ Significant thinness	4 (36.36)	2 (4.00)	-	
Eutrophic	7 (63.64)	**30 (60.00)**	4 (57.14)	**0.013**
Risk of overweight/ Overweight	-	**15 (30.00)**	2 (28.57)	
Obesity/severe obesity	-	3 (6.0)	1 (14.29)	
Total n (%)	11 (100)	50 (100)	7 (100)	

Note: Pearson's Chi-Squares Test, with a significance level of 5%.

Table 3 – Association between the interviewed parents' perception of responsibility and the decision of the correct type of food for their preschool child and nutritional status. Sao Paulo, 2020.

Frequency of responsibility in deciding the right type of food	Never/ rarely	Half of the time	Most of the time/ always	P value
Nutritional status	**n (%)**	**n (%)**	**n (%)**	
Thinness / Significant thinness	2 (50.00)	-	**4 (7.27)**	
Eutrophic	1 (25.00)	5 (55.56)	**35 (63.64)**	
Risk of overweight/ Overweight	1 (25.00)	2 (22.22)	14 (25.45)	**0.025**
Obesity/ Severe obesity	-	2 (22.22)	2 (3.64)	
Total n (%)	4 (100)	9 (100)	55(100)	

Note: Pearson's Chi-Squared Test, with a significance level of 5%.

Table 4 – Association between the level of education of the interviewed parents and food consumption of snacks in preschool children. Sao Paulo, 2020.

Food consumption (snacks)	Never/ less than 1x/ month	1 to 3x/ month	2 a 4x/ semana	1 ou mais x/ dia	Total	P value
	n (%)	**n (%)**	**n (%)**	**n (%)**	**n (%)**	
Education	**Pizza (1/2 slice)**					
Illiterate / Incomplete Elementary School	-	-	1 (100.00)	-	1 (100%)	**0.001**
High school complete / Incomplete Higher Ed. or Complete Higher Ed.	30 (44.78)	29 (4328)	3 (4.48)	5 (7.46)	67 (100%)	
Education	**Potato Chips (1 package)**					
Illiterate / Incomplete Elementary School	-	-	1 (100.00)	-	1 (100%)	**0.001**
High school complete / Incomplete Higher Ed. or Complete Higher Ed.	37 (55.22)	23 (34.33)	3 (4.48)	4 (5.97)	67 (100%)	
Education	**Sandwich (1/2 unit)**					
Illiterate / Incomplete Elementary School	-	-	1 (100.00)	-	1 (100%)	**0.031**
High school complete / Incomplete Higher Ed. or Complete Higher Ed.	40 (59.70)	17 (25.37)	6 (8.96)	4 (5.97)	67 (100%)	

Note: Pearson's Chi-Squared Test, with a significance level of 5%.

DISCUSSION

It was found that preschoolers had most of their meals at school, especially those whose parents worked outside the home. The school environment should be a privileged space for health promotion, with the supply of adequate and healthy food, which encourages the autonomy of healthier food choices and combats the supply of high-calorie foods[13].

The school can be considered an important place to carry out activities related to the promotion of health and adequate nutrition in childhood. Meals offered by educational institutions seem to have a protective effect on children, as they serve as a complement to meals made at home, thus ensuring nutritional adequacy of the daily food supply[14].

In terms of the family environment, the functioning and behavior of the family during meals can be associated with aspects of the child's health. Evidence suggests that parents' behavior and family context can influence children's eating behavior[1,3,5,6]. Family meals provide an opportunity for children to experience their parents' examples of food consumption. Moreover, the function of a family meal is very important for children who spend more time at home and depend on the involvement of family members with their food[5,15].

Mothers tend to have a greater impact on their child's nutrition, as they usually participate more in the preparation of meals. On the other hand, unhealthy maternal eating habits, as well as the availability of higher-calorie foods at home, influence the development of childhood obesity[16].

In the present study, a high percentage of children's exposure to electronic devices during meals was observed. This finding is considered an important agent of eating behavior, providing an obesogenic environment[6]. This habit decreases the child's attention when eating and consequently reduces the signs of hunger and satiety[17], in addition to influencing the purchase of high-calorie foods advertised, generating a negative result for the formation of eating habits[18].

Although more than half of the study sample was classified as having a eutrophic nutritional status and parents correctly perceive their children's weight, it is important to note that most of those considered overweight were perceived as "normal". Regarding the classification of underweight and overweight, there is a relevant percentage of parents who see their children in the wrong way. The association between parenting practices and the child's weight has a bilateral relationship, that is, the practices can influence the child's weight, but they can also be exercised as a result of the child's weight[19].

The highest percentage of underestimation of children's weight occurred in the category of preschoolers who were overweight. The study by Warkentin *et al.*[20] examined the misperception of the child's weight status by parents, and weight underestimation also occurred more commonly among overweight, obese, and extremely obese children[20]. The more overweight the child was, the greater the perception of the child's actual weight status was. It is suggested that parents are correctly informed about their children's weight, in order to make families aware of the associated health risks[21].

This finding was also observed in smaller proportions, in which 28.8% of mothers underestimated their children's weight and the tendency of mothers to overestimate the weight of thin children and underestimate the weight of overweight children was higher[22]. This finding may be due to the lower rates of overweight children, which also occurred in the present study.

Almosawi *et al.*[7] noticed that children whose parents misunderstood their weight had a

lower score in the healthy food consumption pattern compared to children whose parents correctly perceived their weight classification. In the present study, however, no association in relation to preschoolers' weight perception and food consumption was identified.

Regarding the positive association between the choice of the correct type of food by the parents and the nutritional status of the preschooler, it was observed that the majority were classified as eutrophic and that the parents felt responsible "most of the time/always" for making that decision. This involvement of parents in choosing healthy foods for their children can impact food consumption and, consequently, nutritional status[1,3].

Most mothers feel more responsible for feeding their children compared to fathers. Although the father is responsible for food and is considered an important agent that contributes to the children's eating behavior, mothers continue to maintain greater responsibility in this area and are considered "protective" when it comes to deciding on the correct type of food and diet[16,23].

Most studies focus only on maternal practices and perceptions, and the inclusion of fathers in studies is important to consider their individual behaviors. Unfortunately, this study cannot contribute to this finding since most of the sample consisted of the mothers of preschoolers.

Parental food control practices are strategies that aim to increase or reduce the intake of certain foods for various reasons[19]. These practices, when performed in a severe way, have a negative effect on children with less self-regulation of food intake and children at risk of obesity. The literature suggests that moderate dietary restriction and monitoring practices promote diet quality and reduce the risk of obesity. On the other hand, severe restriction and monitoring practices should not be encouraged in the treatment of obesity, as it can cause harm to the child's health, since some impositions are made in relation to food[24]. Those who provide guidance, establish routines and limits can help to manage a child's access to sweets and snacks[23].

Freitas *et al.*[21] were able to observe in their study that the use of the maternal practice of restriction was associated with the mother's perception of her child's excess weight. Frankel and Kuno[25] tested the influence of restrictive practices and feeding control imposed by fathers and mothers and their effect on self-regulation of caloric intake among preschoolers. The results indicate that practices between fathers and mothers differ, and the use of food control and restriction by the mother was negatively associated with the children's ability to self-regulate while the same was not observed with the father[25].

Khandpur *et al.*[26] also noted differences such as the fathers were generally less likely to monitor intake and limit access to food compared to mothers. Most studies cannot be generalized and account for the practices of mothers as well as those of fathers[26]. Furthermore, although the literature does not provide clear data on the association between parental practices of food control and age of parents, it is understood that the maturity of the sample can be beneficial to understand and guide their children in relation to the offer of sweets.

Regarding the consumption of snacks and higher education among parents, a positive association was observed, in which the supply of these foods had a lower frequency of consumption among preschoolers. The study by Batalha *et al.*[27] showed that processed and ultra-processed foods contributed more than a quarter of the total calories consumed by children whose mothers had less than 12 years of schooling. Thus, the lower level of education of mothers was negatively associated with the consumption of these products. Parents' education and longer study time can have a positive influence on knowledge about healthy eating and the power to choose in relation to the supply of food to their children[27].

A limitation in this study was the small sample size, which came only from private schools, because, due to the pandemic, access to public

schools, initially planned, was not possible. Thus, the results are restricted to this public, requiring further studies with a larger sample, both in public and private schools.

However, this research was important for reporting instruments that make it possible to investigate the associations between parental practices and perceptions and children's eating behavior; thus, a space was opened for the development of new, more detailed investigations on the subject. The identification of these associations in early childhood has a great impact on health and nutritional status in the future of the individual, and parental behavior becomes involved in nutritional interventions.

CONCLUSION

It is concluded after carrying out this study that the correct perception of the interviewed parents regarding their children's weight and the perception of their responsibility in deciding the correct type of food influence the nutritional status of preschool children. The age of the parents was positive in restricting sweets for preschoolers. The higher parental education and the low frequency of snack consumption among preschoolers in this study have a positive relationship, but parental practices did not influence the food consumption of preschoolers.

CRediT author statement

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