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SCIENTIFIC ARTICLE

Parental attitudes, beliefs, and practices about child feeding: relationship with preschooler's weight status

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KEYWORDS
Children;
Nutritional status;
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Abstract
Background: Parental beliefs, attitudes and practices in children's nutrition may determine deviations in the acquisition of the child's food preferences and in their self-regulation, who can influence their nutritional status.
Objectives: To evaluate the parental attitudes, beliefs and practices about child feeding and their relationship to the child's nutritional status.
Methods: Cross-sectional and descriptive study developed in a sample of 1393 parents (mother: mean = 34.47 years old; SD = 5.29; father: mean = 36.87; SD = 5.69), from 1424 children, average age 4.58 (SD = 0.99), living in some regions of Portugal. Children's anthropometric measurements were evaluated and classified according to the NCHS referential (CDC, 2000). The Child Feeding Questionnaire was used (Birch et al, 2001).
Results: Overall, 60.2% of children had normal weight, 5.5% underweight, 34.3% overweight (including obesity 17.4%), weight is significantly higher in males (36.8%) (Qui-square = 31.22; p = 0.000). Feeding practices that had higher mean values were *perceived responsibility* (mean = 13.43) and *pressure to eat* (mean = 14.21). Beliefs of concern, and practices of pressure to eat and reward are significantly higher in parents with lower income (p = 0.000). Performed a linear regression (stepwise method) between BMI and parental eating practices, we found that the greater *concern about the child's weight* (β = 0:24; p = 0.000) and greater *practices of control* (β = 0:12; p = 0.000), higher BMI and higher *pressure to eat* (β = -0.240; p = 0.000), the lower the child's BMI, explaining 12.4% of the BMI variability.
Conclusion: These results are a further contribution to the evidences of the influence of controlling eating behaviour in the child's self-regulation capacity, with implications on their food behaviour and increasing the risk of future obesity. This highlights the importance of assessing the practices of families in nutrition education programs, adjusting them to the growth pace and profile of children.

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Background

Childhood obesity and metabolic complications related thereto emerge as a challenge to global health in the 21st century, given its dramatic increase in the last decade in most countries.[1] Numerous risk factors have been reported as being associated to the development of obesity in childhood, among which familiar microenvironment has been considered as the determinant with the highest predictive value. Therefore, understanding of the formation of eating habits, particularly of food intake patterns, and the type of familiar interactions created during meals;[2] is considered decisive to plan more effective interventions. The formation of eating habits involves physiological regulation factors and numerous environmental factors, such as the cultural and socio-economic context of the family, its habits, behaviours and practices regarding eating, in which parents or carers act as mediators and models of food-related learning for children.[3,4] During childhood, family is an indispensable benchmark, as it is assumed that it is in the familial space that basic needs are satisfied, taught and learned, particularly in terms of eating and consumption patterns.[5,6]

Nonetheless, the act of eating entails a significant emotional load for the mother, taking into account that, in the eyes of the family, society and culture in most countries, she is in charge of ensuring the growth and well-being of her child.[5,7] This process and the interactions related thereto change over time since birth, following the psychosocial development and physical growth of the child. During the first 5 years of life, eating behaviour is closely tied up with the features of quick growth that mark this stage of life, but it is important that the inconstant progression of this quick growth is respected[5]. In the face of the different phases of appetite and preferences of children, usually associated to them, it is essential to adjust feeding attitudes and practices, in order to create a healthy eating experience.[8,9] Particularly after the second year of life, "physiologic anorexia" is a source of concern and stress in the family, being conducive to less adequate eating attitudes and practices which often have the opposite effect, as young children appear to develop more appropriate eating habits when they have permission to manage the amount of food they want to eat among a healthy food offer.[10] Several studies have documented that parental attitudes and practices during feeding tend to shape the child's eating habits, showing a high risk of development of overweight.[2,11-13] Externally controlled behaviour and practices have also been associated with a lower ability of children to self-regulate their appetite or even with growing dependence on those external stimuli. Some evidence reveals that parents' feeding practices influence the children's food preferences,[13,17,18] the eating behaviors[14] and can affect children's regulation of energy intake.[15] In a longitudinal study Faith et al.[10] observed that feeding practices of *restriction, monitoring and pressure to eat* at the age of 5 were predictors of BMI increase in children with high-risk genes. The reverse is also true; parenting behaviours are also influenced by child characteristics. In this case, it is more likely that the children's weight status or concerns about the child's weight status influences parents' feeding practices.[5,16-19]

So, an important question is: what is the relationship between attitudes, beliefs and parental feeding practices and children's nutritional status? This paper was designed to address this question.

Material and methods

This was a cross-sectional, descriptive and correlational study, conducted within the scope of a broader project, titled "MISIJ - Monitorização de Indicadores de Saúde Infanto-Juvenis: Impacto na Educação para a Saúde" (Monitoring of Child and Youth Health Indicators: Impact on Education toward Health), reference FCT PTDC/CPE-CED/103313/2008, performed at the Escola Superior de Saúde/Instituto Politécnico de Viseu-Portugal. It was conducted with a non probability sample of 1393 parents (mother: mean = 34.47 years old; SD = 5.29; father: mean = 36.87; SD = 5.69), from 1424 children, average age 4.58 (SD = 0.99), living in some regions of Portugal.

The assessment of children's weight and height was performed using a standard scale and checked for these anthropometric parameters (SECA®), in accordance with procedures set in a manual created to standardize the procedures of the fieldwork team.

To assess eating practices, the Child Feeding Questionnaire (Birch et al, 2001) was used, with permission from the authors.[12] The original version of the CFQ is composed of 31 questions/statements, but in this study only 29 were used, given the age of the participating children. In the author's version the study has seven dimensions, distributed among parental beliefs which include *Perceived responsibility* (items 1 to 3), *Perceived parent weight* (items 4 to 7), *Perceived child weight* (items 8 to 13), *Concern about the child's weight* (items 14 to 16) factors. Attitudes and practices include *Monitoring* (items 17 to 19), *Restriction* (items 20 to 27) and *Pressure to eat* (items 28 to 31) factors. Questions are assessed using a Likert-type scale with five answer possibilities and the higher the mean score, the higher the final score. It had to be validated for the Portuguese population to be used in the study, a procedure which began by its translation, performed by an expert in the English language (native of the United States), followed by a back-translation by an English teacher. The instrument was also slightly modified in terms of linguistic customization. The psychometric study showed a global *Cronbach's Alpha* of 0.750 and the selection of seven factors, which account for 67.82% of the total variance when considered as a whole. The structure of the CFQ, although it keeps the seven factors from the original version and a superposable organization of factors 1, 2, 4, 6, showed the exclusion of *Perceived parent weight* and *Perceived child weight* factors (factor 2 and 3 in the original) and split of the 8 items of *Restriction* factor into 3 factors, which due to the features of the statements were named *Restriction, Control* and *Reward*, and the final questionnaire ended with 21 items.

Ethical procedures were safeguarded, by obtaining prior permission from the General Directorate of Innovation and Curricular Development to carry out the study in preschools, the authorization for data collection from the Directors of each School and free and informed consent was obtained from parents who accepted to participate.

All analyses were performed with SPSS® – Statistical Package for Social Sciences (Version 21.0 for Windows).

Results

Family socio-demographic characterization

The sample under analysis was composed of 1393 parents, with the mother's age ranging from 19 to 51 years (mean = 34.47 years old; SD = 5.29) and that of the father from 21 to 62 years (mean = 36.87; SD = 5.69), 77.7% of the participants were married, most of them lived in rural areas (57.3%), 57.9% had a low household income and 33.3% had completed basic education and lower secondary education (between 7-9 years of school) on equal terms with those with secondary/vocational education (12 years of education).

Parental attitudes, beliefs, and feeding practices

Analysing the mean values of the CFQ per factor, which varies according to the number of items, it was found that the highest values correspond to the *perceived responsibility* (13.43) and *pressure to eat* (14.21) factors, whereas the lowest figures correspond to *reward* and *concern about the child's weight* factors (mean = 4.19 and 7.64 respectively). The student's t-test indicates that there are no differences in the values of beliefs, attitudes and practices of parents regarding the gender of children, except for *concern about the weight* in girls (t-test = -2.292; p = 0.022) (Table 1).

The *Mean Ranks* indicate that younger mothers (≤ 25 and 26-32 years) using more procedures of monitoring (711.3), beliefs of concern about the child's weight (833.6), *pressure to eat* and attitudes of *reward* (732.5 and 749.5), whereas older mothers (≥ 40 years) have a higher *perceived responsibility* (721.6), practices of *restriction* (723.5) and those with 33-39 years use more measures for food intake *control* (706.4), which were only statistically significant in terms of *concern about the child's weight* and *pressure to eat* (Chi-square = 18.962; p = 0.000; Chi-square = 9.979; p = 0.019 respectively).

Mothers who had completed basic education and lower and upper secondary education show a higher use of practices of *monitoring, restriction,* as well as beliefs of *perceived responsibility*, whereas there is a significantly higher rate of mothers with primary education with *concern about the child's weight* who use more practices of *control*, *pressure to eat* and attitudes of *reward*. Parents holding primary education have higher mean values in all types of *belief, attitudes and practices*. Nonetheless, these figures were only statistically significant in terms of *restriction*, *concern about the child's weight, pressure to eat* and *control* practices.

Families with a median income use more *monitoring* and *control practices* and have higher levels of *perceived responsibility*, although these figures are merely relevant in *reward*, whereas those with low income use more attitudes and practices of *reward, restriction, pressure to eat* and have a higher level of *concern about the child's weight*, which is statistically significant (p > 0.000).

Children's nutritional status

The average BMI was 16.708 (12.1-26.0; SD = 1.83), and was highest in boys ("varón" BMI: $\bar{x}$ = 16.76; SD = 1.79; "mujer" BMI: mean = 16.49; SD = 1.88), without significance (t = 1.319; p = 0.187). Overall, 60.2% of children had normal weight, 5.5% were underweight and 34.3% overweight (including obesity 17.4%), being that significantly higher in males (36.8%) (chi-square = 31.22; p = 0.000) and in 5 year old children (39.5%) and low weight in 4 years old (14.0%) (chi-square = 101.301; p = 0.000).

Relationship between parental attitudes, beliefs and practices about feeding and children's nutritional status

A multiple-regression analysis with stepwise method was used to determine how much the variance of BMI scores could be explained by maternal child-feeding attitudes and practices. It was observed that only the *concern* about the child's weight and practices of *pressure to eat* and *control* were predictive of the BMI of the child, which explain 12.4% of this variability when considered as a whole. Using beta or standardized coefficients, it was found that *pressure to eat* is the one with the highest predictive value (β = -0.24) and its reverse connection with the child's BMI allows us to infer

Table 1 Descriptive statistics and CFQ factors by gender

	Boys (mean ± SD)		Girls (mean ± SD)	
Age	4.61	1.01	4.55	0.97
BMI	16.76	1.79	16.62	1.85
Monitoring	12.59	2.22	13.64	2.27
Perceived responsibility	13.44	2.00	13.43	2.16
Restriction	12.99	2.22	12.91	2.31
Concern about the child's weight	7.43	3.52	7.87*	3.57
Control	10.90	3.57	10.90	3.53
Pressure to eat	14.22	3.71	14.20	4.06
Reward	4.19	2.41	4.19	2.42

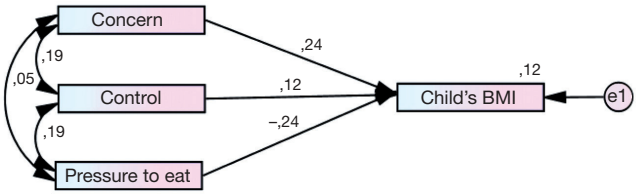

Figure 1 Final adjusted model of the relationship between feeding practices and the child's BMI.

that a lower *pressure to eat* is associated with a higher BMI. Other practices had a positive connection with BMI, which indicates that as the *concern about the child's weight* and practices of feeding *control* increase, the child's BMI also increases.

Discussion

This study analyzes the connection between parental beliefs, attitudes and practices about feeding and the nutritional status of preschool children. Regarding the descriptive data of the CFQ, results indicate overall higher mean values in the *perceived responsibility* and *pressure to eat* factors and, when genders are compared, higher mean values in *monitoring* and *concern* about weight factors, which are only significant in terms of *concern* about the weight of girls. Other studies report this fact.[5,18] One possible interpretation is that mothers perceive overweight girls as more unhealthy or victims of social criticism, and thus use more controlling child-feeding practices.

Several studies have been developed in western countries on this subject, but the influence of family socio-demographic variables and even cultural factors underlying parental practices are far from being known.

During this research, it was found that younger mothers (25-32 years) have higher levels of *concern about the child's weight* and the adoption of practices of *pressure to eat*, which can somehow reflect the anxiety that underlies the act of feeding. As mentioned by some authors[5,7] this act has a high emotional load for the mother, due to the responsibility that society and children's well-being impute to her. Younger and possibly less experienced women can live these moments under greater stress, which promotes the choice of less healthy feeding attitudes and practices. In terms of schooling, it was found that parents with low education and low income tend to apply more attitudes and practices of *control* during feeding and have higher levels of *concern about the child's weight*. Moreover, Aparício-Costa (2012)[5] observed in his study that younger parents admit using more controlling measures and having higher levels of *concern about the child's weight*, whereas little education and low income were associated with a higher *concern about the child's weight* and more practices of *pressure to eat*. Similarly, the study by Cooke &Wardle, (2005)[4] using a sample of London-based children, documents that demographic characteristics (ethnicity and the mother's educational level) influenced not only practices, but also the type of food the family ate.

After analyzing the connection between the nutritional status of the child and parental beliefs, attitudes and practices about feeding, it was found that more practices of *control* and higher levels of *concern about the child's weight* and less *pressure to eat* were associated with overweight children. The results of the influence of parental feeding practices have been frequently interpreted through cause and effect reasoning. Nonetheless, parental attitudes may not follow a random pattern, but rather be partly stimulated by prior features of logical reasoning of the child, as some studies suggest.[5,17-19] The cross-cutting analysis of this work does not allow extrapolating from the cause-effect relationship of these practices, but it is another contribution to the already solid evidence that controlling feeding practices are associated with lower self-regulation skills in children, which can impede self-control, responsible for the sensation of hunger and saciety, with implications in food intake behaviour and increasing the risk of becoming obese in the future.

Conclusions

Since influences which promote obesity in children and adolescents include numerous factors, this issue must be handled as one of the greatest social and public health challenges at the present time.

In this study, the assessment of parental beliefs, attitudes and practices about child feeding in the face of age, education and household income penalizes underprivileged sections of the society, a fact which has not been documented in other studies. On the other hand, food-related beliefs of concern about the child's weight, practices of control and pressure to eat were related to overweight children. More specifically, the higher the level of concern about the child's weight, the higher the control and the lower the pressure to eat are linked to increase overweight. This fact, without stating the cause-effect relationship, is another contribution to the acknowledgment that feeding practices can be partly stimulated by prior features of logical reasoning of the child. This evidence does not cease to support the need of development of an intervention plan, which must however be suitable to this reality and therefore contribute to the prevention of childhood obesity.

There is an urgent need to intervene during childhood as a *window of opportunity* and thus with high relevance in the long term for health promotion. This study shows the special urgency of intervening with the poorest families, as in other fields of Child Health.

Therefore, we conclude, highlighting the importance of guidance and support of families for the adequacy of feeding practices and, even not considering specific recommendations for prevention of childhood obesity, teaching parents to adjust feeding practices in a perceptive and healthy manner to the growth pace and profile of children, regardless of the underlying risk factors, will certainly be beneficial for parent-child interaction and for promotion of nutritional health in preschool children.

What is known about the subject

Some evidence reveal that parents' feeding practices influence the children's food preferences, the eating behaviours and can affect children's regulation of energy intake and

the reverse is also true, because parenting behaviours are also influenced by child characteristics of nutritional status.

What is new about this study

This study confirms that in a sample of Portuguese parents of preschool children the beliefs and concern about the child's weight, control practice and pressure to eat were related to child's weight and the reverse is also true.

Parents socioeconomic characteristics, particularly the younger parents, with less education and lower income tend to have more feeding practices of control and exhibit more beliefs and concern with the child's weight.

Conflict of interests

The authors declare that there are no conflicts of interests.

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