

Original articles

Maternal complaints about feeding problems and anthropometric parameters of children with a diagnosis of pediatric feeding disorder

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ABSTRACT

Purpose: to describe the anthropometric parameters of children diagnosed with pediatric feeding disorder by a multiprofessional team.

Methods: a retrospective clinical study conducted on 196 children on maternal complaints of feeding difficulties and a diagnosis of pediatric feeding disorder. Children with neurological diseases or having no pediatric feeding disorder diagnosis were excluded from the study. Weight and height data were obtained and parameters such as weight-for-age, length/height-for-age and body mass index for-age were analyzed, according to the recommendations of the World Health Organization. The two-proportion equality test was used and the level of significance was set at 0.05 (5%) in all analyses.

Results: results showed mean (\pm Standard Deviation) values of 13.09 ± 5.1 for weight (kg), 0.61 ± 15.53 for height (cm) and 15.37 ± 1.56 for body mass index (kg/m^2). The results also showed that 87.2% of the children were within the adequate z-score for weight-for-age, 93.4% were within the adequate z-score for length/height-for-age, and that 88.8% had a normal z-score for-age for body mass index.

Conclusion: the sample of children diagnosed with pediatric feeding disorder exhibited adequate anthropometric parameters for their age range.

Keywords: Pediatrics; Feeding and Eating Disorders; Feeding and Eating Disorders of Childhood; Anthropometry

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INTRODUCTION

According to the 2019 published consensus, pediatric feeding disorder (PFD) is defined as inappropriate oral intake for the age, by a child, and may be associated with medical, nutritional or psychosocial changes and/or with feeding skills. PFD may have an impact on the physical, social, emotional and/or cognitive functions of children, in addition to causing stress for the caregivers involved in their feeding¹.

The literature has reported the importance and impact of healthy feeding on the growth and development of children, as well as its action on the short- and long-term prevention of disease^{2,3}. Children with PFD represent a heterogeneous group in terms of countless aspects, among them food intake with quite specific characteristics. Thus, this feeding behavior involves a greater vulnerability of nutritional status, representing one of the major concerns about these children^{4,5}.

Studies investigating the nutritional status of children with PFD have reported controversial results^{6,7}. Up to 2019, the absence of a single nomenclature or a single diagnostic criterion for these children had led to different literature conclusions about their anthropometric parameters, so that it was not possible to state that there actually was a correlation between these parameters and PFD.

A review article showed that patients with feeding difficulties had a significantly lower body mass index (BMI)/age z-score than children with appropriate feeding, as well as a smaller percentage of body fat⁶. Other studies included in the review showed that children with feeding problems had a lower z-score for length/height-for-age than children with no feeding difficulties. In another review study looking for a relationship between food selectivity and weight status, the authors reported that 17 of the 41 studies reviewed had not detected any association between these variables⁷. In two studies, feeding behavior was positively associated with overweight, and in 5 other studies it was negatively associated with overweight or obesity. In contrast, the authors detected a positive association with low weight in 6 of the studies analyzed⁷. In addition, a longitudinal study observed that the mean weight, height, and BMI course of selective feeding children did not indicate growth faltering compared to control⁸.

Few studies are available about the characterization of the profile of children with PFD despite a yearly increase in the percentage of prevalence of this condition^{5,9}. It is of fundamental importance to have a

general overview and knowledge of feeding problems in order to obtain an early diagnosis and to provide the necessary referrals and clinical decision making regarding nutritional status or other feeding problems. In addition, it is necessary and important to listen to the complaints of these children's parents.

In most cases, the pediatrician is the first professional to hear from the parents the complaint "My child does not eat". According to parental reports, this complaint is often discouraged by the doctor after an anthropometric evaluation considered normal, as if there were no feeding problem when a child gains weight and grows as expected. In general, the pediatrician is the first professional to whom the parents have access and who strongly influences them. Thus, an early understanding of the parental complaints about child feeding becomes essential for prevention, early diagnosis and assertive conducts. These professionals need to be alert to parental complaints since their guidance and opinions are followed by most parents. A study reported that parents wanted more information and support about the development of their children and that, in some cases, pediatric practice did not take into account their current concerns¹⁰.

When the parents are uncomfortable or when their questions are not clarified, they may engage in behaviors that are harmful to the feeding development of their children. A study reported that mothers who perceive their children as being of low weight use more pressure strategies regarding feeding¹¹. A systematic review revealed that pressure feeding practices are associated with decreased weight gain and lower weight status, while other authors showed that maternal concerns about the excess weight of their children led to a significant use of unusual feeding practices^{12,13}.

In this population it is observed that the indication of appropriate treatment is often postponed when the weight and height of the child are adequate. When these families are received, they seem to be quite discouraged as they try to find out "how" to feed their children. Many are aware of "what" and "how much" their children "need to ingest" as they are counseled by their pediatricians. However, the greatest difficulty for most of them is "how" to offer food to their children so that they will accept it without discomfort and without parental "insistence". Learning to eat is something that requires comfort, skill, motivation and curiosity so that, perhaps, the appropriate weight or excess weight should not be the only factors that invalidate the parental complaint¹⁴. Counseling parents and

pediatricians about how to help children promotes this learning in a gradual manner. Also, emphasizing the autonomy of the child, his sensory perceptions and curiosity for different foods may elicit more assertive behaviors and actions.

However, the lack of a screening instrument is an additional difficulty for an early diagnosis by a pediatrician. In an attempt to reduce this screening difficulty and to permit a pediatrician to identify alert signals early and to determine whether or not there is a PFD, a recent study demonstrated that the items of a questionnaire developed and applied were psychometrically solid, permitting the distinction between children with and without PFD¹⁵. This instrument also proved to be useful for the family itself to be able to determine whether or not the feeding behavior of a child follows a normal pattern and also to help the family find appropriate care when necessary.

PFD is considered a group of various characteristics. Thus, identifying the profile of this population, paying attention to the complaints of the parents and making a correct and early diagnosis may prevent the increase of even more severe signs and symptoms, nonresponsive feeding practices, and stress on the family/social dynamics. On this basis, in view of the need to better understand PFD exclusively in a population with non-neurological diseases whose mothers have complaints about feeding difficulties, the goal of the present study was to describe the anthropometric parameters of children diagnosed with PFD by a multiprofessional team. It was hypothesized that even with maternal complaints, these children may show adequate anthropometric parameters for their age range, which may mask the real feeding behavior of the children.

METHODS

The study was approved by the Research Ethics Committee of the Universidade Federal de São Paulo - UNIFESP, Brazil (protocol number 4.558.967). All ethical criteria were respected, according to current legislation.

This was a retrospective clinical study conducted on Brazilian children with PFD treated at the Children Development Institute from 2018 to 2020.

All participants were seen at the same reference center for the treatment of children with feeding difficulties. The center is staffed by a group of professionals including a speech language pathologist, occupational therapists, a psychologist, and a nutritionist.

Retrospective data were collected for 196 (125 males and 71 females) children of a medium and high socio-economic profile who came to the institute by spontaneous demand (knowledge about the institute by means of communication media and/or indication by other patients) and/or by referral by other professionals.

The inclusion criteria for the study were parental complaints, the most important being: "My child does not eat", "My child does not try new foods", "My child does not eat his meals at the table", "My child only eats with distraction", and "My child does not chew".

The children were seen by the multiprofessional team, according to the normal flow of care of the institution. This process consisted of three different stages. An interview of the parents with a speech therapist, the evaluation of the child by the team, and a new contact with the parents for a report about the aspects evaluated and an interconnection of the factors observed. In general, the evaluation considered aspects of the sensorimotor-oral skills of the child, his relationship regarding the foods usually consumed and new ones, the sensory characteristics of his preferred foods (smell, flavor, texture, visual presentation, temperature etc), his performance in his sensory functions (tactile, vestibular, visual and proprioceptive), as well as in his motor and praxis functions for the identification of changes in the processing of sensory integration. In addition, the team investigated the nutritional status of the child and the entire complexity of the pediatric feeding difficulties in terms of the emotional aspects of the child and his family. If necessary, at the end of the evaluation by each professional, the child was referred to other specialties (gastropediatricians etc).

The diagnosis of PFD was made according to the 2019 consensus¹. The following diagnostic criteria were used:

A) children with an oral nutrient intake inappropriate for age of a duration of at least three months, in association with one or more of the following items¹:

a. Medical dysfunction demonstrated by one of the following conditions:

- Cardiorespiratory involvement during oral feeding
- Impaired structure/function of the gastrointestinal tract
- Neurologic impairments

b. Nutritional dysfunction demonstrated by one of the following conditions:

- Malnutrition
- Specific nutritional deficiency or significantly restricted intake of one or more nutrients resulting from decreased dietary diversity

c. Feeding skill dysfunction demonstrated by one of the following conditions:

- Need for adaptation of fluid or food texture
- Use of a position or of equipment for feeding adaptation
- Use of strategies for feeding adaptation

d. Psychosocial dysfunction, demonstrated by one of the following conditions:

- Active or passive flight behavior when eating or being fed
- Inappropriate handling by the person in charge of the feeding and/or nutritional needs of the child
- Rupture of social functioning within the feeding context
- Rupture of the child-caregiver relationship associated with feeding

B) Absence of cognitive processes consistent with a feeding disorder

However, children with neurological diseases, having no PFD or PFD classified into acute (< 3 months' duration) diagnosis were excluded from the study.

The collected anthropometric weight and height data obtained from the individual medical records were recorded by the nutritionist of the institute using the WHO Anthro software which permitted the calculation of weight-for-age, length/height-for-age and BMI-for-age and the graphic registration of the results¹⁶.

The graphs adopted were those recommended by the World Health Organization (WHO) for boys/girls aged zero to five years¹⁶. The cut-off points for the various curves are represented as z-scores, which indicate standard deviation units of the median value (z-score 0).

In the case of premature patients who were admitted before 2 years of age and of extremely premature patients (gestational age <28 weeks) admitted before 3 years of age, the WHO curve was used with correction for chronological age.

The cut-off point and the nomenclature adopted for each z-score range detected were those recommended by the WHO¹⁶. In addition, all data were dichotomized as adequate and inadequate for age range.

The precision of the demographic and anthropometric data collected by the nutritionist was verified by a research assistant through the database review.

Data were analyzed by descriptive statistics using the mean \pm standard deviation. The two-proportions equality test was used to determine the relative frequency distribution (percentages) of the qualitative data. The level of significance was set at 0.05 (5%) in all analyses. The SPSS V20 and Minitab 16 software was used for analysis.

RESULTS

The mean age of the 196 children with PFD chronic included in the study was 2.8 ± 1.72 years and the mean age at the beginning of the feeding difficulties was 9.33 ± 7.05 months. Approximately 24 (12.4%) of them were premature ($p < 0.001$) and 25 (13.4%) had food allergies ($p < 0.001$), with cow's milk protein been the allergen most frequently mentioned.

Mean \pm SD weight (kg) was 13.09 ± 5.1 , height (cm) was 90.61 ± 15.53 and BMI (kg/m^2) 15.37 ± 1.56 (Table 1).

Table 1. Weight, length/height and Body Mass Index characteristics of the study population

	N	Mean \pm Standard Deviation
Weight (kg)	196	13.09 ± 5.16
Length/Height (cm)	196	90.61 ± 15.53
BMI (kg/m^2)	196	15.37 ± 1.56

Caption: BMI = Body Mass Index

Dichotomization of the data showed an adequate classification for-age range of 170 children (87.2%) for

weight-for-age, of 183 (93.4%) for length/height-for-age, and of 174 (88.8%) for BMI-for-age (Table 2).

Table 2. Frequency distribution of dichotomized anthropometric parameters

	n (%)	p-value
(z-score) weight-for-age (N=195)		
Adequate for age range	170 (87.2)	p<0.001
Inadequate for age range	25 (12.8)	
(z-score) length/height-for-age (N=196)		
Adequate for age range	183 (93.4)	p<0.001
Inadequate for age range	13 (6.6)	
(z-score) BMI-for-age (N=196)		
Adequate for age range	174 (88.8)	p<0.001
Inadequate for age range	22 (11.2)	

Caption: BMI = Body Mass Index
Two-proportion equality test

Figures 1, 2 and 3 show the anthropometric indices according to the z-score classification of the WHO¹⁶. The weight-for-age classification was severely

underweight for 5 children (2.6%), underweight for 14 (7.1%), and overweight (3.1%) for 6.

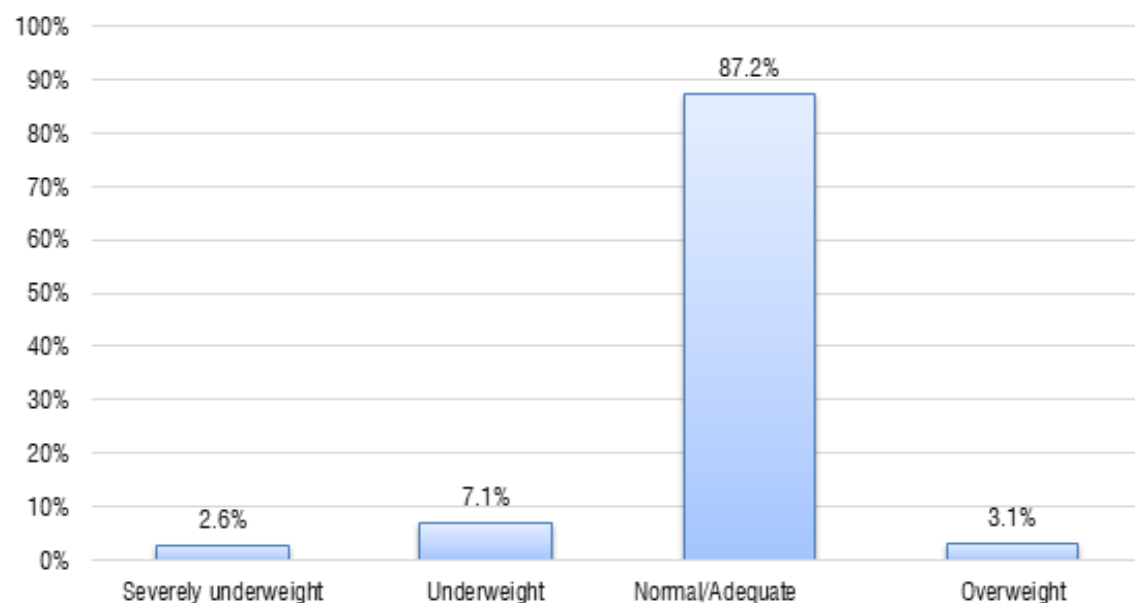


Figure 1. Frequency distribution of (z-score) weight-for-age

The length/height-for-age was stunted for 8 children (4.1%) and severely stunted for 5 (2.6%).

Regarding the BMI-for-age, 5 children (2.6%) were classified as severely wasted, 11 (5.6%) as wasted, 5 (2.6%) as being overweight, and only 1(0.5%) as being obese.

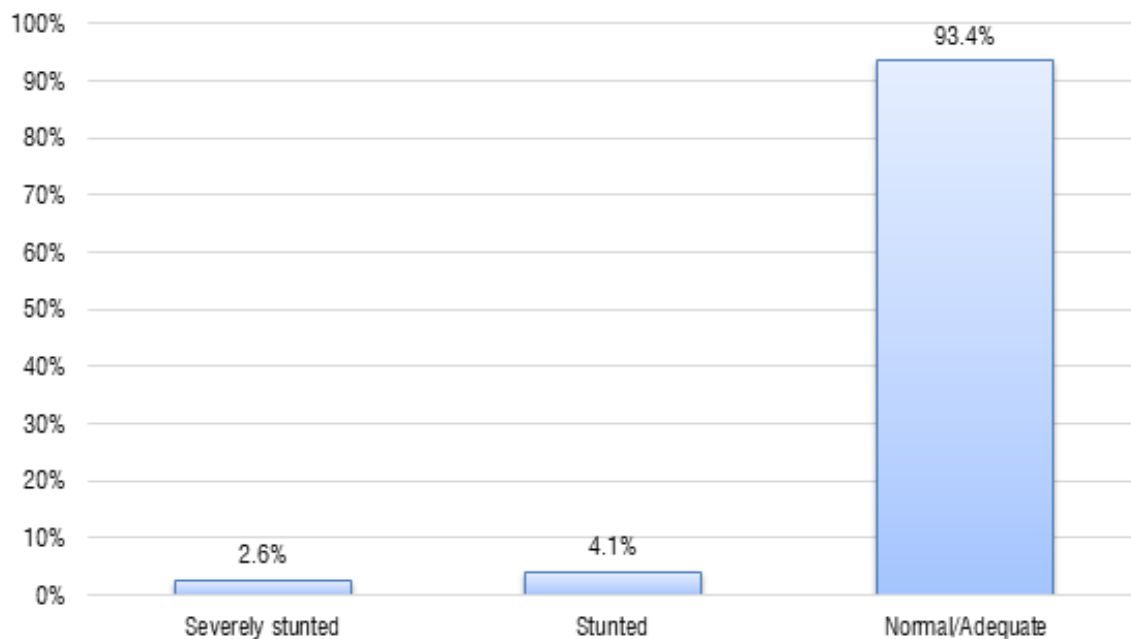
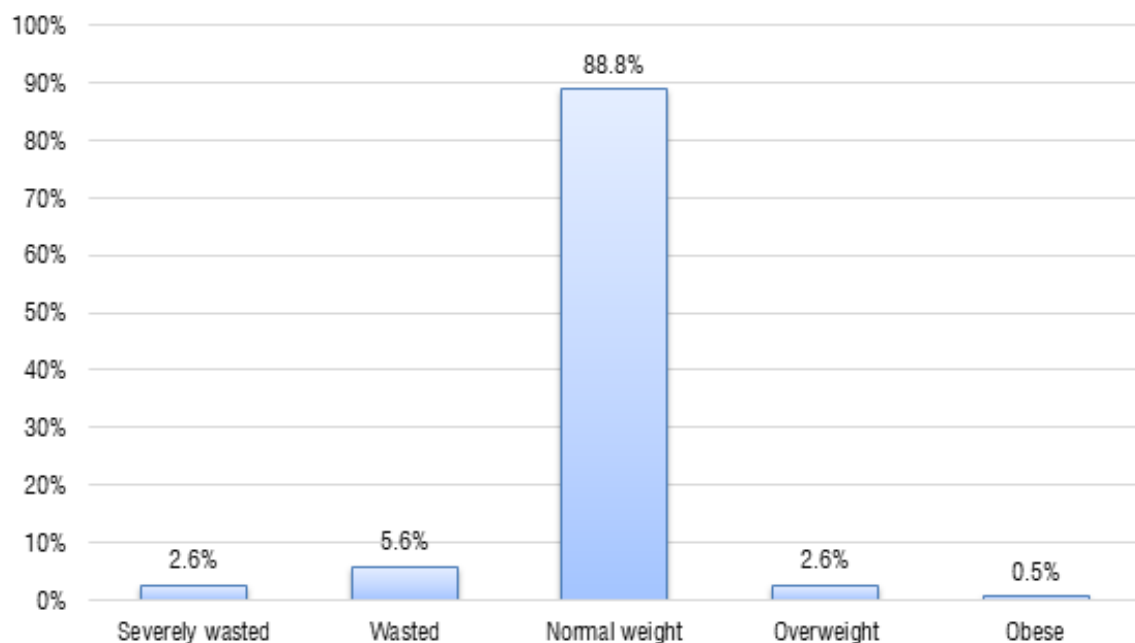


Figure 2. Distribution of (z-score) length/height-for-age



Caption: BMI = Body Mass Index

Figure 3. Distribution of (z-score) BMI/age

As preterm infants and those allergic to cow's milk protein were found in the sample characteristic, were also detailed of these two groups the anthropometric indices according to the z-score. For weight-for-age, were found 4 and 3 preterm, respectively in the severely underweight (5/196) and underweight (14/196) classifications. For length/height-for-age, the results showed that all of 5 (5/196) children severely stunted were preterm, and for stunted was just 1 (8/196). Regarding the BMI-for-age, children that were classified as severely wasted (5/196) just 3 were preterm. For wasted (11/196) the results showed 2 preterm. None of these premature children were allergic to cow's milk protein. Already in these allergic children, the results for weight-for-age showed that 3 were underweight (14/196), for length/height-for-age just 1 (8/196) were stunted, and for BMI-for-age the results also found that just 1 child was severely wasted (5/196).

DISCUSSION

Despite the increasing percent prevalence of PFD observed each year among typically developing children^{5,9}, there is still not enough research about the characteristics of this population. In the present study, it was sought to identify the anthropometric parameters of 196 children with complaints of feeding difficulties who were also diagnosed with PFD chronic according to the consensus¹ of the multiprofessional team of the institution. Listening to parental concerns, identifying the profile of children with PFD and understanding their anthropometric parameters can prevent the onset of even more severe problems. The hypothesis was confirmed that even in the presence of parental complaints about the feeding behavior of their children with a diagnosis of PFD chronic, the anthropometric parameters of these children were more frequently adequate for their age range when they were accepted into an integrative responsive feeding therapy program.

An early diagnosis of PFD, even among typically developing or non-neurologic children, can prevent the increase of more severe signs and symptoms and of their negative impact on health, in addition to minimizing the impact on family and social dynamics within the context of child feeding. A recent study characterizing the prevalence of PFD in the American population has reported that an early recognition of this disorder is essential in order to prevent nutritional repercussions and a possible worsening of the underlying health status⁵. The authors stated that doctors should recognize and diagnose PFD and look for an

early treatment of the condition, while also having a specific code that will guarantee more uniform care in the public and private health system. An instrument was developed according to the screening line research and has proved to be useful for the professionals who had no such instruments available for an early identification of individuals with PFD¹⁵.

Our results showed that, at the time when the children were seen at the institution, their mean age was 2 years and 8 months, although their parents reported that the complaint had started at 9 months of age. It can be seen that there is a gap between the time of onset of the complaint and the time when treatment is sought. Our findings are closely similar to those of Maximino et al.¹⁷ who reported that in about 75% of the study population with feeding difficulties the onset of the complaint observed by their parents was before 2 years of age, with a median onset of the complaint at 8 months of age. In addition, another result similar to the present one was the frequency of premature babies, which was approximately 13% in both studies. In view of these results and their convergence with the data of Maximino et al.¹⁷, was questioned for what reason the parents did not look earlier for treatment of their children in view of the persistence of the complaint.

All parents of the children studied here reported important complaints about the feeding of their children, although the anthropometric data obtained in our study showed that, even with the complaints of feeding difficulties and the diagnosis of PFD, 87.2% of these children were within the normal weight-for-age and 93% were in the normal length/height-for-age. The data also showed that 88.8% had a normal BMI-for-age. In other words, despite the vulnerability of nutritional status due to feeding behavior, the results showed that the anthropometric data of this population were not always below the expected levels, possibly masking the real feeding behavior of the children.

In a study conducted by a Brazilian group at a center for childhood feeding difficulties¹⁷, most of the children evaluated had values considered adequate for age range in terms of BMI-for-age and length/height-for-age indices even though there was a tendency towards the lower percentages of developmental patterns, also similar to those detected in the present study. Regarding weight status, Brown et al.⁷ reported data similar to those detected in our study. In a systematic review⁷, the authors detected no association between complaints of feeding difficulties and weight status in 17 of the 41 studies reviewed. At a lower proportion,

some of the studies reviewed pointed out a correlation between feeding difficulty and overweight, whereas others detected a positive association with low weight. The authors attributed these discrepant results to inconsistencies in both the classification/nomenclature of signs and symptoms and in the diagnostic criteria used.

In our sample, even with positive results regarding anthropometric data, in the initial treatment of these children, was observed that the complaints of the parents referred to worries about refusal to eat specific types or textures of foods, difficulties in transitioning to age-appropriate foods, food selectivity, insufficient intake of vegetables, fruits and legumes, refusal to self-feed, and inappropriate feeding behaviors. Simione, et al.¹⁸ pointed out the difficulties of the parents regarding the lack of knowledge of the professionals about PFD, the questioning about the reason why the children did not eat, and the barriers against appropriate care. The authors emphasized that pediatricians should be alert to and value the parental complaints regarding feeding even when their children do not show any changes in development. They stated that the lack of guidance and support may contribute to maternal stress, may compromise the relationship between parents and children and affect the daily routine of the entire family, also creating a false expectation of appropriate growth due to the normal developmental curves¹⁸⁻²¹.

Even with important parental complaints about the feeding of their children, in our clinical experience with the care of these children, simply analyzing the anthropometric data, as previously stated, may not be the only directive for the investigation and conduct of these cases. The present results show that, even with a complaint and a diagnosis of PFD, there were children with an appropriate classification regarding all anthropometric parameters investigated, a fact that did not guarantee the use of responsive feeding practices. Gingras et al.²² stated that the pressure to eat is possibly used by the parents in order to promote greater food intake when they fear that their children do not consume sufficient amounts of specific food or nutrients.

Our results showed that the anthropometric data were suitable for the age group of our sample at the time of the evaluation. Unfortunately, in this study we did not relate these data to other variables in order to explain this finding. However, discussions about possible reasons for clarifying adequate anthropometric data

should be registered. When the family of a child with PFD does not find enough support and guidance, they can often use unresponsive practices for the child's nutrition. Thus, one of the possible reasons is the way the child is being fed (distracted or forced to ingest more volume without autonomy, a monotonous diet, high-calorie/hyperprotein diet or the use of nutritional supplement). According to some authors, parents perceive that this practice makes the child more capable of eating or consuming food that they consider ideal for his development²³⁻²⁶. This fact can disguise anthropometric data. In addition, it may also impair the child in the perception of his internal signs of hunger and satiety. As a result, it creates a dependency of the child to be fed and it may hinder his self-regulation and autonomy regarding the amount of food ingested²⁷.

Although the objective of the present study was not to determine a relationship between complaints and anthropometric data, the results obtained indicate the need to learn even more about the profile of these children. In our opinion, the combination of understanding about PDF, listening to parental complaints and collecting objective data represents what is needed to provide effective care for this population. However, even though the present results revealed a profile of 196 children with PFD chronic, the study had some limitations. Due to the retrospective design of the study, other data that would provide further understanding of the profile of these children were not included, such as the association of anthropometric measurements with parental practices, child's autonomy, family meals, and type and quantity of foods ingested. Prospective studies are needed in order to continue to better identify the profile of this population, so that the professionals facing the feeding difficulties will be able to learn about the profile of this population, to make decisions based on scientific evidence and to reach a facilitated diagnosis of PFD and a more effective treatment of the condition.

CONCLUSION

It was concluded that the sample of children diagnosed with PFD exhibited adequate anthropometric parameters for their age range.

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