

## Feeding difficulties among Brazilian children: prevalence and associated factors

Dificuldades alimentares em crianças brasileiras: prevalência e fatores associados

Dificultades alimentarias en niños brasileños: prevalencia y factores asociados

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### Abstract

**Objective:** to present characteristics related to feeding difficulties (FD) in Brazilian children. **Methodology:** cross-sectional, observational, descriptive study with a quantitative approach that used a structured electronic questionnaire on FD, management and reaction of caregivers to these difficulties, family repercussions, source of knowledge on the subject and professional approach. **Results:** one thousand caregivers of children aged between 6 months and 10 years answered the questionnaire in full. FD initially manifested between 1 and 4 years of age in 62% of children. Rejection of trying new foods was the main FD (61%); 65% of the children consumed five or less types of food/day, with cooked foods being preferred by 79%; 33% of caregivers attributed the cause of FD to inadequate examples of family feeding and 32% admitted difficulties in keeping the child focused during feeding. Most caregivers reported that FD don't affect or have little effect on the family dynamics or child's school life. Caregivers reported offering another food to replace the refused one (42%), insisting on offering a new food (30%) and seeking guidance from a pediatrician (50%) or nutritionist (28%), who advise repeatedly offering new foods in different forms/preparations (41%); 70% of caregivers maintain appointment with the same pediatrician after diagnosis of FD. As a result of FD, 86% of caregivers fear that their children will develop "low immunity" and become sick. **Conclusions:** FD in the first years of life is prevalent in Brazil, causing concerns for caregivers of these children.

**Keywords:** Child nutrition; Food fussiness; Child care; Appetite; Caregivers; Eating; Feeding behavior.

### Resumo

**Objetivo:** apresentar características relacionadas às dificuldades alimentares (DF) em crianças brasileiras. **Metodologia:** estudo transversal, observacional, descritivo com abordagem quantitativa que utilizou questionário eletrônico estruturado sobre DF, gestão e reação dos cuidadores a essas dificuldades, repercussões familiares, fonte de conhecimento sobre o assunto e abordagem profissional. **Resultados:** 1.000 cuidadores de crianças entre 6 meses e 10 anos responderam integralmente ao questionário. A DF inicialmente se manifestou entre 1 e 4 anos de idade em 62% das crianças. A rejeição da experimentação de novos alimentos foi a principal DF (61%); 65% das crianças

consumiam cinco ou menos tipos de alimentos/dia, sendo os alimentos cozidos preferidos por 79%; 33% dos cuidadores atribuíram a causa da FD a exemplos inadequados de alimentação familiar e 32% admitiram dificuldades em manter a criança focada durante a alimentação. A maioria dos cuidadores relatou que a FD não afeta ou tem pouco efeito na dinâmica familiar ou na vida escolar da criança. Os cuidadores relataram oferecer outro alimento para substituir o recusado (42%), insistindo em oferecer um novo alimento (30%) e buscando orientação de um pediatra (50%) ou nutricionista (28%), que aconselham repetidamente oferecer novos alimentos de diferentes formas/preparações (41%); 70% dos cuidadores mantêm consulta com o mesmo pediatra após o diagnóstico de DF. Como resultado da FD, 86% dos cuidadores temem que seus filhos desenvolvam "baixa imunidade" e adoeçam.

**Conclusões:** A DF nos primeiros anos de vida é predominante no Brasil, causando preocupações para os cuidadores dessas crianças.

**Palavras-chave:** Nutrição da criança; Seletividade alimentar, Cuidado da criança Appetite; Cuidadores; Ingestão de alimentos; Comportamento alimentar.

### Resumen

**Objetivo:** presentar características relacionadas con las dificultades alimentarias (DA) en niños brasileños. **Metodología:** estudio transversal, observacional, descriptivo con enfoque cuantitativo que utilizó un cuestionario electrónico estructurado sobre DA, manejo y reacción de los cuidadores ante estas dificultades, repercusiones familiares, fuente de conocimiento sobre el tema y enfoque profesional. **Resultados:** mil cuidadores de niños de entre 6 meses y 10 años respondieron el cuestionario en su totalidad. La DA se manifestó inicialmente entre 1 y 4 años en el 62% de los niños. El rechazo a probar nuevos alimentos fue la principal DA (61%); El 65% de los niños consumió cinco o menos tipos de alimentos / día, siendo los alimentos cocinados preferidos por el 79%; El 33% de los cuidadores atribuyó la causa de la DA a ejemplos inadecuados de alimentación familiar y el 32% admitió dificultades para mantener al niño enfocado durante la alimentación. La mayoría de los cuidadores informaron que la DA no afecta o tiene poco efecto en la dinámica familiar o la vida escolar del niño. Los cuidadores informaron que ofrecieron otro alimento para reemplazar el rechazado (42%), insistieron en ofrecer un nuevo alimento (30%) y buscaron orientación de un pediatra (50%) o nutricionista (28%), quienes aconsejan ofrecer repetidamente nuevos alimentos en diferentes formas / preparaciones (41%); el 70% de los cuidadores mantienen una cita con el mismo pediatra después del diagnóstico de DA. Como resultado de la DA, el 86% de los cuidadores temen que sus hijos desarrollen "baja inmunidad" y se enfermen.

**Palabras clave:** Nutrición del niño; Irritabilidad alimentaria; Cuidado del niño; Appetito; Cuidadores; Ingestión de alimentos; Conducta alimentaria.

## 1. Introduction

To develop their full potential for growth and development, children must consume an adequate and balanced diet that meets their nutritional needs (Haines et al., 2019). Nutrition, essential for human survival, is characterized in childhood by its challenging profile and is a source of stress for family members. The food-related process can be considered as a communication route between family members, sometimes showing difficulties in the mother-child relationship, through situations that are characterized as feeding difficulties (Müller et al., 2017).

Feeding behavior is determined by the interaction of factors such as the physical and emotional development stage, relationships with the family and social, economic and cultural aspects (Gontijo et al., 2011). As there is a sensitive and critical period for the acquisition of food preferences, it is critical to know the different stages of neuropsychomotor development, since anatomical, functional and behavioral changes allow the child to acquire, in addition to greater coordination, new oral skills and the ability to interact with food (Harris & Mason, 2017).

The development of dietary habits is a chronic and complex process influenced by attitudes, values, culture, social relationships and family beliefs. During the process of forming dietary habits, children may present difficulties characterized, according to Kerzner et. al classification, by food fussiness (refusal or preference for specific flavors, odors, textures, colors and consistencies), appetite limitation and food phobia (Lobos & Januszewicz, 2019; Maximino, Machado, et al., 2020; Maximino, Ricci, et al., 2020). The prevalence can vary between 8% and 50%, according to different studies with children in different countries (Maranhao et al., 2018; Steinberg et al., 2021; Yang, 2017). These conditions have been called feeding difficulty (FD) (Weffort et al., 2022), which is characterized as a set of all issues related to food, which negatively affect the process of offering food/nutrients to the child, regardless of cause or severity (Maranhao et al., 2018; Yang, 2017). Although

FD is often considered a simple and transient problem, several health repercussions have already been shown (Nogueira-de-Almeida et al., 2012), implying the need for appropriate treatments for each case (Nogueira-de-Almeida et al., 2018).

Knowledge of the profile that FD presented in a given population can help in the adequate preparation of professionals who will work with these patients and in collective health measures. The purpose of this study is to present some characteristics related to feeding difficulties among Brazilian children. Use the paragraph as a template.

## **2. Methodology**

### **Study design**

Cross-sectional, observational, descriptive study with a quantitative approach using secondary data obtained from a questionnaire structured by *Editora Abril*, containing objective and easy-to-understand questions, answered electronically. This validated methodology has been used in many studies (Köche, 2016) and due to the use of secondary data to achieve the purposes of this study, available on public domain websites, there was no need for submission to the Research Ethics Committee, as well as obtaining written consent from the participants.

### **Study population**

The study population consisted of parents or caregivers from all regions of Brazil, using a convenience sample. The call with invitation to participate was published on the social networks of *Editora Abril* in the period from April 1 to 30, 2020. In the dissemination, the objectives of the study were not informed. The text said only: "if you are the mother or father of a child aged 6 months to 10 years, you are invited to participate in a scientific study that will be done through a digital questionnaire". All persons interested in participating were initially considered for the survey. In the initial contact, it was verified those that met the inclusion criteria: 1) to accept to participate in the study, 2) to have children or be responsible for children aged between 6 months and 10 years and 3) to have children or be responsible for children with some type of feeding difficulty. Those who did not meet the inclusion criterion were not considered for the present study. Exclusion criteria were: 1) to not have completely answered the questionnaire. A total of 2274 people accessed the survey link and started filling out the online questionnaire. Of these, 98 people refused to answer and 1176 did not meet the inclusion criteria, therefore being excluded from the study. The final sample consisted of 1000 parents or caregivers.

### **Data collection**

The structured questionnaire was made available on a digital platform (website) and disseminated through social networks, which invited interested people to take part in the study in different regions of the country. The study was developed from May 01 to May 28, 2020.

The variables studied were age and sex of children and parents, family income, nutritional status, associated diseases, feeding difficulties: age at onset, complaints about these difficulties, causes of these difficulties, strategies adopted by parents to overcome these difficulties, where parents seek information and parents' concerns regarding the repercussions on the child's health.

### **Statistical analysis**

Univariate analysis of categorical variables was carried out using absolute frequency distribution.

### **Conflict of interests**

The company Danone Nutrícia financed the expenses related to the data collection conducted by publisher Abril

### 3. Results and Discussion

A total of 1000 parents or caregivers of children aged between 6 months and 10 years took part in the study, 92% of whom were mothers and 83% were over 30 years of age. Most families lived in the Southeast region of the country and 37% received up to 3 minimum wages. As for the children, 45% are between 1 and 4 years old, 41% were classified as having adequate weight and 74% had no associated diseases. The sociodemographic characteristics of the study population are described in Table 1.

**Table 1** – Sociodemographic characteristics of the study population (n=1000).

Age group (parents) (years)	(%)
Up to 29	17
30 to 39	44
Over 40	39
<b>Age group (children)</b>	
7 to 11 months	3
1 to 2 years	20
3 to 4 years	25
5 years	13
6 to 7 years	16
8 to 9 years	14
10 years	9
<b>Nutritional status (children)</b>	
Low weight	24
Overweight	15
Appropriate weight	41
Unable to inform	16
<b>Associated diseases (children)</b>	
No disease	74
Food intolerance	6
Respiratory disease	6
Food allergy	5
Difficulty swallowing or reflux	5
Other	4
<b>Family income in minimum wages</b>	
Up to 3	37
3.1 to 10	31
Over 10	9
Not reported	23
<b>Region of Brazil (domicile)</b>	
North and Midwest	12
Northeast	22
Southeast	49
South	17

Source: Authors.

Feeding difficulties in childhood initially manifested between 1 and 4 years of age in 62% of cases. Rejection to try new foods occurred in six out of ten households in the sample. More than half of the respondents still reported the child's refusal to eat or the consumption of small amounts as a worrying factor. The aversion to vegetables and behaviors considered inappropriate at the table (such as lack of interest in the food or jokes) figured in about 40% of households. The variety of foods consumed by children was restricted to less than 5 types in 65% of cases, with greater preference for cooked and baked preparations (Table 2).

**Table 2** – Characteristics related to child feeding difficulties (FD) (n=1000).

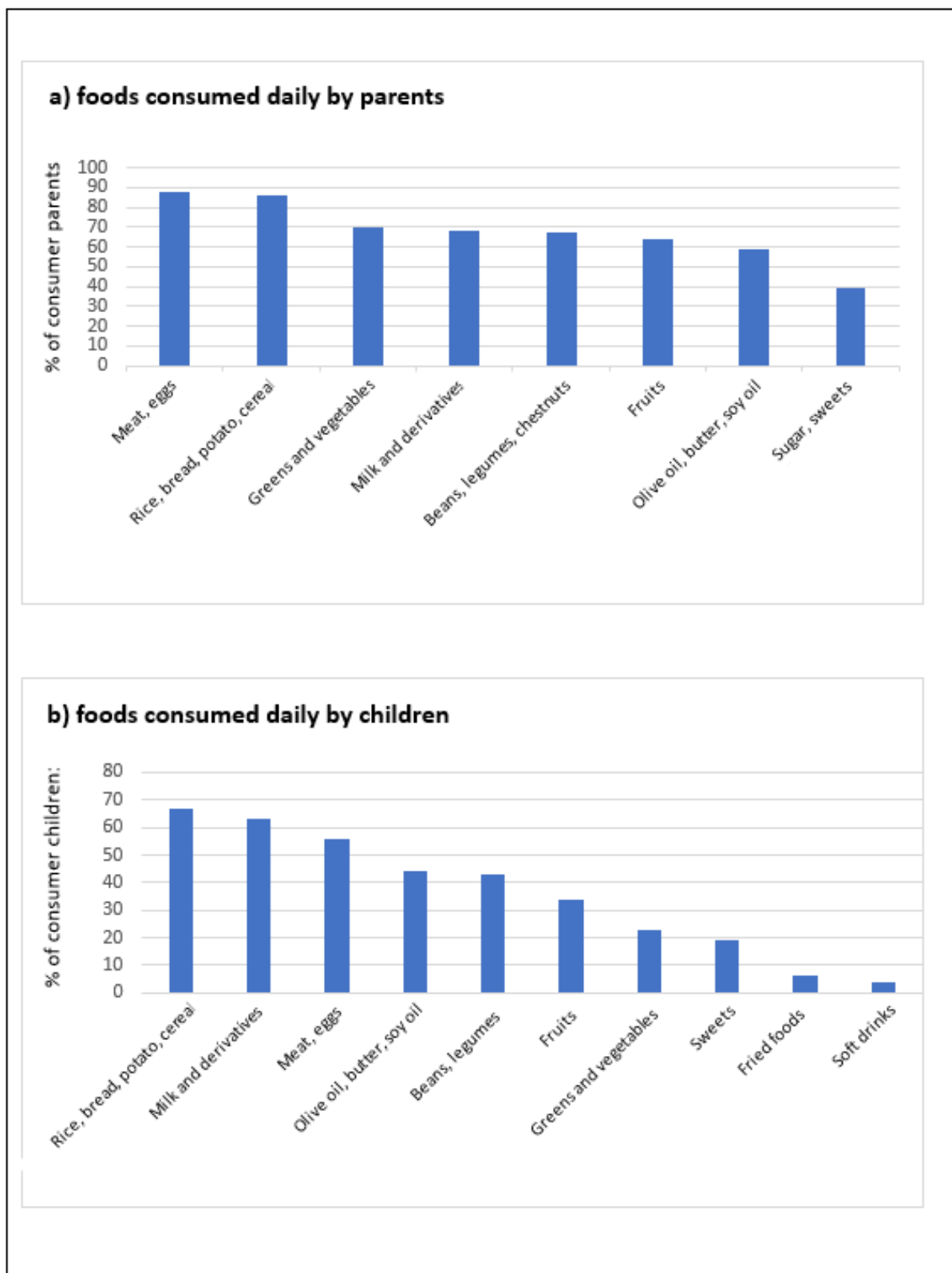
Age (years) of onset of FD manifestation	(%)
Younger than 1	15
1 to 2	36
3 to 4	26
5	11
6 to 7	6
8 to 9	3
10	3
<b>Main complaints of FD</b>	
Difficulty trying new foods	61
Refuses to eat, or eats too little	53
Refuses fruits and vegetables	44
Eats only one type of food or food group	42
Inappropriate behavior at meals	37
<b>Habit of trying new foods</b>	
Does not try	42
Yes, but with difficulty	42
Yes, whenever it's offered	10
The family does not usually vary feeding	6
<b>Habit of consuming the entire meal offered</b>	
Leaves half the food on the plate	33
Leaves ¼ of the food on the plate	35
Eats all the food	29
Repeats	3
<b>Types of food consumed per day</b>	
15 or more	2
11 to 14	5
6 to 10	28
5 or less	65
<b>Preparations consumed by children</b>	
Cooked	79
Roasted	65
Fried	56
Grilled	43
In natura	26

Causes attributed to feeding difficulties	
Inappropriate examples in the family	33
Lack of time	17
Lack of guidance from healthcare professionals	15
Lack of access to good professionals and information	14
Financial difficulties	13
Full time at school	6
Full time with babysitter	4
Unknown	23

Source: Authors.

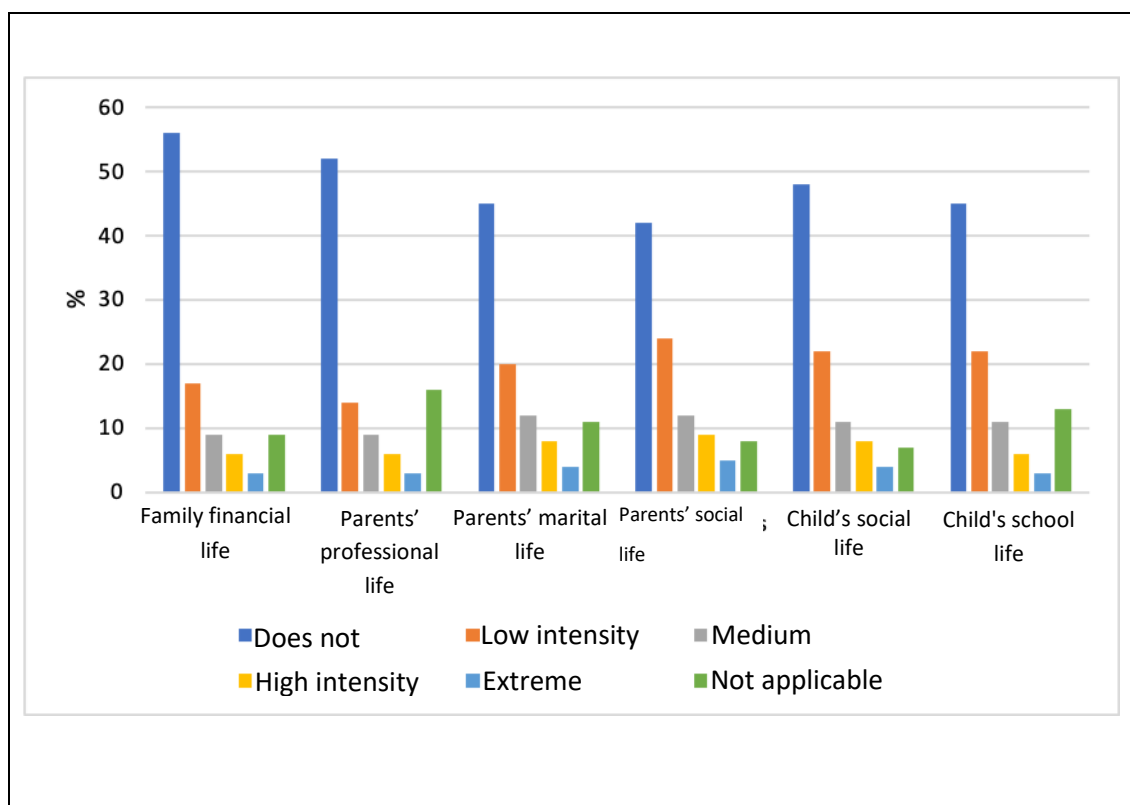
Parents attributed the inadequate examples of family feeding as the main cause related to child feeding difficulties (Table 2). It is noted that between 30% and 40% of parents do not eat vegetables and fruits daily (Figure 1A), a fact that reflects the low daily intake of these foods by their children (Figure 1B). The foods most accepted by children with feeding difficulties were rice, bread, potatoes, cereals, cow milk and dairy products (Figure 1B). The stress, conflicts and frustrations of getting the child to eat also directly affected the marital life of couples in 44% of households, as well as the social life of 45% of children and 50% of parents (Figure 2).

**Figure 1** – Frequency of food consumption of parents (a) and their respective children (b).



Source: Authors.

**Figure 2** – Impact of feeding difficulties on the daily life and life habits of families.



Source: Authors.

It is noted that 20% of the parents offered dessert or toys as a reward for the child to eat more. Only 54% tried to offer the refused food again on other occasions and 24% tried to offer the food in another form of preparation (Table 3). In addition, only 50% of parents look for information about healthy eating from pediatricians; 28% of these with nutritionists and 6% with psychologists; while 31% seek information on social networks, 28% on blogs and 15% on TV (Table 3).



**Table 3** – Strategies adopted to encourage children’s food consumption and the places where they seek information regarding infant feeding (n=1000).

Strategies adopted when the child consumes less than they should	(%)
The child is grounded	3
Offering reward (dessert, toys)	20
Not offering anything in return	35
Offering another food that the child likes so that they do not miss a meal	42
<b>Strategies adopted when the child does not try new foods</b>	
Not offering more food	7
Offering again on another occasion	24
Offering in another form of preparation	25
Offering multiple times on any occasion	30
Insisting and forcing until the child tries it	14
<b>Sources of information on infant feeding</b>	
Pediatrician	50
Social networks	39
Nutritionist	28
Health magazines, websites and blogs	28
TV, radio, newspapers	24
News website	23
Medical association websites	13
General magazines	12
Digital influencers	8
Psychologists	6
Does not seek information	12

Source: Authors.

The main concern of parents regarding their children’s feeding difficulties is low immunity and the risk of illness (86%), followed by impairment in physical development and growth (77%). Most parents (61%) do not feel fully prepared to deal with fussiness and, after diagnosis, 50% seek professional guidance while 26% seek information online (Table 4).

**Table 4** – Main parental concerns related to children’s feeding difficulties and reactions after diagnosis (n=1000).

Parents’ main concerns	(%)
Low immunity and risk of illness	86
Impaired physical development and growth	77
Impaired intellectual and mental development	60
Impaired social development	14
Impaired family relationships	10
<b>Main difficulties faced by parents</b>	
Keeping the child focused at the time of feeding, with no distractions	32
Maintaining a diverse diet every day	20
Inappropriate examples in the family	11
Financial difficulties	9
Having access to good healthcare professionals	7
Time to preparing food or stocking the house	8
More product nutritional information	3
Other	10
<b>Parents’ reactions after the diagnosis of feeding difficulties</b>	
Asking for professional guidance for feeding correction	50
Questioning the reason for the diagnosis	30
Searching information online	26
Requesting a food supplement recommendation	24
Asking friends and family for guidance	15
Not believing and seeking other medical opinions	6
<b>Parents’ attitudes after the diagnosis of feeding difficulties</b>	
Keeping visiting the same doctor	70
Changing doctors	17
Does not change doctors, but look for a nutritionist	13

Source: Authors.

In consultations with healthcare professionals, 91% of parents claim that they need to comment on their child’s feeding difficulties, as the healthcare professional does not ask them about this issue. In addition, 45% of the parents reported that the pediatrician reported that there was no reason for concern because the child’s weight and height were adequate in the growth curves. Only 28% of parents reported having received complete nutritional guidance, and four out of ten respondents stated they did not incorporate the dietary changes prescribed by healthcare professionals (Table 5).

**Table 5** – Characteristics of the assessment of infant feeding made by healthcare professionals (n=1000.)

Main recommendations made by the pediatrician or nutritionist	(%)
Offering the same food several times, in different types of preparation and formats	41
Avoiding distraction during eating (TV, cell phone)	35
Making mealtimes enjoyable with fun dishes	27
Changing family diet (example from parents)	26
Replacing denied foods with others with the same nutritional value	22
Adding food supplementation	18
Adding sports into the routine	17
None of the above	19

Source: Authors.

The number of issues related to childhood feeding, including limited appetite, selective intake and fear of eating, although identified a long time ago, had the terminology standardized by Kerzner et al 2015 as feeding difficulties (FD) (Kerzner et al., 2015), denoting conditions that manifest themselves in varying intensities and are influenced by many personal, family, social and environmental factors (Chilman et al., 2021).

The age group between the second and fifth years of life is the one most often presenting with FD (Weffort et al., 2022) since in this period the influence of taste experiences obtained during breastfeeding arising from the mother's diet is observed, as well as other factors such as lower growth rate in relation to the first 2 years of life, greater difficulties in introducing foods that were not offered properly at the beginning of the weaning process, together with the innate preference for sweet and salty flavors (Prado-Netto et al., 2017; Torres et al., 2020; Warkentin et al., 2016).

The prevalence of FD is very variable. In Brazil, Maranhão HS et al 2018, studying children aged between 2 and 6 years in day care centers in the state of Rio Grande do Norte, found 37.2% of feeding difficulties (Maranhao et al., 2018), while other studies found prevalence of 34% and 37% in the northeast region of the country (Fisberg et al., 2019; Siqueira, 2018) and up to 44% in the state of São Paulo (Fisberg et al., 2019; Magalhães et al., 2020).

In other countries, considering children without other health problems, the prevalence of FD ranged from 2% in Australia, 5.6% in the Netherlands, 22% in the USA and 30% in Canada (Marshall et al., 2015; Maximino et al., 2016), reaching rates of 50 to 80% (Silverman et al., 2021) if they are considered children with some physical or emotional problem (Edwards et al., 2022; Marshall et al., 2015).

Parents' level of education and family income may be related to a higher prevalence of FD, but few studies have discussed this association. Nogueira LR et al 2020 found lower consumption of vegetables and fruits among children whose parents had a higher level of education and, therefore, access to a greater variety of foods (Nogueira et al., 2020), which does not occur among children of families with lower socioeconomic status (Vieira et al., 2003). However, a study carried out among children aged between 2 and 6 years attending daycare centers found no association between family income and FD (Maranhao et al., 2018).

The most common complaints of parents/caregivers that can be characterized as FD are neophobia (difficulty accepting new foods), fussiness (demanding diet in terms of appearance, texture and taste, with reduced intake of vegetables and fruits), low intake (the child does not "eat enough") and stressful meals (Cooke et al., 2017; Marshall et al., 2016; Steinberg et al., 2021), which is also noted in this study, supporting that, although the problem is known, there is still a lack of greater investments both in child/families care and in the health education process (Chilman et al., 2021).

The main causes of FD mentioned by the parents/caregivers taking part of this study are in line with the results verified by other authors. Authoritarian, stressed and/or anxious family members (Machado et al., 2017; Maximino, Machado,

et al., 2020; Rachmah et al., 2022), unstructured families with little time dedicated to child care and lack of access to services and health professionals who offered adequate information were the most prevalent. Literature also shows that excessive concerns about the child's weight (Kachani et al., 2005), pressure for the child eat what they do not like, use of coercion, pressure, threats and reprimand (Adamson et al., 2013; Kachani et al., 2005) and distraction at meals contribute to resistance to food consumption (Maximino, Machado, et al., 2020). It should also be noted that other factors such as lack of organization during meal times (Rachmah et al., 2022), meals offered in inappropriate, time-consuming and distracting places (mainly television) (Machado et al., 2017) and low frequency of meals shared with family members (Maximino, Machado, et al., 2020) are also directly related to FD (DeCosta et al., 2017; Silva et al., 2021; van der Horst et al., 2016).

The foods most refused by children with FD are vegetables (83%), roots such as yams and cassava (49%) and fruits (45%) (Steinberg et al., 2021), which have texture and consistency that are unpleasant and/or are at odds with oral sensitivity, which leads to greater intake of puree, dairy products and carbohydrates (Kachani et al., 2005; Maximino et al., 2016).

Coping with FD requires the participation and commitment of everyone involved in each situation. Although in some cases FD can resolve spontaneously (Cooke et al., 2017), parents/caregivers/family members need adequate support and guidance to manage the various facets of this situation. Considering that feeding patterns are established from the beginning of life and that children develop their higher mental faculties in the context of family relationships (Boff & Piassetzki, 2018; Silverman et al., 2021), the lack of knowledge of different stages of emotional and behavioral development aspects of the child by parents/caregivers may be related to distorted interpretations of FD. One of the main aspects is the disregard for the child's signs of hunger and satiety (Machado et al., 2017), for which family members, caregivers, doctors and nutritionists must pay attention, seeking to correctly identify the child's physiological needs (Milano et al., 2019).

One of the practices that can be adopted to manage FD is the division of responsibilities, when parents should define when and where to serve meals, while the child can establish how much and what to eat (Magalhães et al., 2020). Responsive care with greater attention and interest from caregivers in the child's feeding process (Machado et al., 2017) through positive support practices, involvement in the preparation of meals that should be made together with the family, healthy emotional environment that makes it possible to expand coexistence (reducing stress and anxiety) and the appropriate physical environment are critical for the full development of the natural process of feeding in childhood (Haines et al., 2019; Silva et al., 2021).

This study has some limitations: convenience sample, answers obtained by self-completed questionnaires, some variables that could not be verified (weight, nutritional status) and the fact that this was a descriptive study.

#### **4. Final Considerations**

FD in the first years of life is prevalent in Brazil, causing concerns for caregivers of these children. Infants and preschoolers require adequate supervision regarding feeding practices, preferences and self-regulation in their diet (Haines et al., 2019). Hence the importance of professionals acting in accompanying family members and advising on good feeding habits from the beginning of life (Araújo et al., 2021), also discussing and guiding on the role of social media as a factor of interaction and search for information by family members, avoiding the influence of virtual communities that are not always made up of people with appropriate training to adequately address the subject (Supthanasup et al., 2021).

Ultimately, it should be noted that strengthening the mother-child bond, encouraging breastfeeding practice, guiding weaning properly in the manner and time (Babik et al., 2021; Müller et al., 2015) and obeying the appropriate time for the introduction of new foods (Northstone et al., 2001; Speyer et al., 2021; Torres et al., 2020) are critical elements of childcare, which promotes food and nutrition education in order to enable feeding to be an interactive, healthy and playful process for the acceptance of food, protecting against FD. Future studies could focus on a more comprehensive evaluation on the relationship

between parents' styles and children behavior, as it's recognized that this interaction will probably determine the profile and the severity of the FD.

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