

Parental feeding strategies in children with Avoidant/Restrictive Food Intake Disorder (ARFID): Association with food refusal behavior

Estrategias parentales de alimentación en niños con un Trastorno de Evitación/Restricción de la Ingesta de Alimentos (ARFID): Asociación con la conducta de rechazo a los alimentos

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What do we know about the subject matter of this study?

ARFID classification criteria, some associations with caregiver and child variables, and general management guidelines are known, however, to date, there is no evidence-based treatment given that it is a newly defined disorder.

What does this study contribute to what is already known?

This study is the only local evidence of parental feeding strategies associated with increased food refusal in children with ARFID, based on the parents' own experience of a diagnosis that is still emerging in Chile.

Abstract

Avoidance/Restriction of Food Intake Disorder (ARFID) is characterized by persistent avoidance and/or restriction of food intake, with three clinical presentations: lack of interest in food, selectivity based on sensory sensitivity, and fear of aversive consequences. The strategies used by parents during mealtimes may predispose or maintain the child's food refusal. **Objective:** to determine the association between parental strategies used during mealtimes and food refusal behavior in ARFID children. **Patients and Method:** Cross-sectional research. Non-probabilistic sampling was used for the selection of participants. Twenty-four parents whose children had been diagnosed with ARFID participated. ARFID subtypes were considered according to DSM-5 criteria: limited appetite, selective eating and fear of eating. Exclusion criteria were ARFID of organic cause and/or pervasive developmental disorders. The Child Eating Behaviors Questionnaire and the Child Feeding Questionnaire were used for data collection. **Results:** An association was evidenced between the parental eating strategy of

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pressure to eat with food refusal behavior, and with child eating behaviors of emotional underfeeding ($p = 0.046$), slowness to eat ($p = 0.016$), refusal in front of food ($p = 0.019$) and satiety response ($p = 0.003$). **Conclusion:** Eating behaviors frequently perceived by parents with children diagnosed with ARFID are related to the dimension of negative approach towards food, such as satiety response, food refusal, slowness to eat and emotional underfeeding.

Introduction

Recognizing the signs and symptoms of childhood eating disorders, both for prevention and treatment, is an upcoming task for health professionals, especially given the recency of diagnosis, lack of studies, and lack of characterization of these populations¹. Lately, in order to improve clinical usefulness in the classification of childhood eating-related diagnoses, the DSM-5, based on field studies and expert opinion, redefined childhood-onset eating disorders as Avoidant/Restrictive Food Intake Disorder (ARFID).

According to DSM-5 criteria, the prevalence of ARFID ranges from 14%² to 22.5%³ in children and adolescents aged 7 to 18 years in international clinical samples from pediatric eating disorder centers. Incidence studies found that 62% of children under 12 years of age with ARFID had atypical presentations²⁻⁴.

ARFID is a heterogeneous condition, resulting from persistent food avoidance and/or restriction, leading to, at least one, of the following four diagnostic criteria that may be related: underweight or stunting, nutritional deficiency, dependence on nutritional supplements to achieve nutritional goals, and/or significant interference with psychosocial functioning. Children whose feeding difficulties are mostly associated with a lack of available food or cultural practice, another medical or mental disorder, or body image disturbance are excluded⁵.

Although there are other classifications⁶, the subtypes of ARFID that have been validated since the DSM-5⁵ are food avoidance due to its sensory properties (taste, texture, smell), poor appetite or lack of interest in food, and fear of the negative consequences of eating (gagging, vomiting, pain, allergic reactions, and others). The expression of these subtypes can occur in different combinations and intensities.

The biological predisposition in ARFID has not been thoroughly studied⁷, however, it has been reported that, for example, taste preferences have a genetic component⁸, and that sensory processing problems and temperament traits have an influence on feeding, especially during early childhood⁹. This would be associated with anxiety disorders, obsessive-compulsive disorders, and attention deficit disorders, among others^{4,10-12}. In addition, a cross-sectional study reports

that the most frequently reported difficulties in eating in quantity or quality are those occurring in the food transitions¹³, which highlights the importance of the daily environmental aspects.

Parents' strategies towards the perception of difficulties in feeding their child would depend on their own characteristics, where maladaptive reinforcement patterns seem to be factors that maintain the problem^{9,14}. Children with feeding difficulties would have parents with higher levels of sensitivity to infant reaction and lower levels of structuring¹⁰, which would induce them to avoid confrontation or abandon efforts, thus exposing them to fewer varied feeding opportunities¹⁰.

In the family context of children with ARFID, feeding strategies have been observed that include food restriction, control of food intake, persuasion to eat, and pressure to eat. The latter includes an intrusive and negative component to force the child to eat¹⁵, and recent studies show that increased parental pressure to eat appears to be associated with ARFID^{12,16}. In addition, pressure to eat would have a counterproductive effect by reducing children's enjoyment of food, with reduced food intake and weight loss^{17,18} and increased negative affect during mealtimes¹⁹.

Additionally, according to the Children's Eating Behavior Questionnaire (CEBQ)^{17,19}, food restriction and parental limits on what and how to eat are associated with negative eating behaviors in children with ARFID, especially decreased hunger sensation or satiety response, slowness to eat, and decreased enjoyment of food.

Recent research suggests the existence of a reciprocal influence between children's refusal to eat, irritability, and restlessness and parental feeding strategies, which would account for the characteristics and feeding behaviors of their children²⁰⁻²². There are still no conclusive studies that determine whether it is childhood food refusal that causes parental pressure or whether parental restraint and pressure induces food refusal in children, therefore, the hypothesis of a bidirectional relationship in feeding interactions is acceptable^{22,23}. Other opinions say that maladaptive reinforcement patterns would be only maintained and not causal factors^{9,14}.

The objective of this investigation was to evaluate the association between parental feeding strategies

used in children with ARFID and childhood food refusal eating behavior.

Subjects and Method

Participants

The sample consisted of 24 parents from Santiago, Chile, whose children had been diagnosed with ARFID and that were under treatment in different primary care centers or private centers specializing in eating disorders. Inclusion criteria were: parents of children between 4 and 10 years old diagnosed with ARFID by psychiatrist, pediatrician, occupational therapist, and/or psychologist according to the DSM-5 criteria. This information was provided verbally to the evaluators. Exclusion criteria were: ARFID associated with organic cause and/or pervasive developmental disorders.

Instruments

1) *Children's Eating Behavior Questionnaire (CEBQ)*²⁴. It evaluates children's eating styles in two dimensions, both with four subscales: (1) negative approach to food: emotional underfeeding, slowness to eat, satiety response, and food refusal, and (2) positive approach to food: emotional overeating, enjoyment

of food, desire to drink, and response to food (Table 1). This questionnaire is validated in Spanish for the Mexican population²⁵, presenting an alpha coefficient reliability of 0.882.

2) *Child Feeding Questionnaire (CFQ)*²⁶. It evaluates beliefs, attitudes, and parental strategies regarding child feeding, based on two dimensions divided into seven subscales: (1) perceptions and concerns related to feeding: concern about the child's weight (W), perceived weight of the child (PWC), perceived weight of the mother (PWM), and perceived responsibility (PR), and (2) parental strategies towards child feeding: pressure to eat (PE), monitoring (M), and restraint (R) (Table 2). It has been validated in Spanish for the Mexican population²⁷, with an internal consistency of 0.858.

3) Sociodemographic information questionnaire: it included age, sex, anthropometry evaluated by health center treating physicians, marital status, and occupation of parents, among others. For the classification of nutritional status, the Z scores of the WHO W/H curves were used for children under 5 years and 29 days, and BMI for children over 5 years and 29 days²⁸⁻³⁰. The Adimark estimation model was used for socioeconomic status (SES)³¹.

Table 1. Description of subscales in "Children's Eating Behaviour Questionnaire" (CEBQ)

Subscale	Description
Satiety Responsiveness (SR)	Reduced sense of hunger caused by food consumption.
Food Responsiveness (FR)	Susceptibility to preferring food with better organoleptic properties in regular contexts.
Emotional Overeating (EO)	Inability to control food intake (eating more) in negative emotional contexts.
Emotional Undereating (EU)	Referring to eating less during negative emotional states.
Enjoyment of Food (EF)	Condition associated positively with the feeling of hunger, the desire to eat, and pleasure from food.
Slowness in Eating (SE)	The tendency to prolong the duration of mealtimes.
Fussiness (FU)	High selectivity because only a few foods are accepted.
Desire to Drink (DD)	The desire to drink and the tendency of having beverages, generally sugary ones, on hand.

Table 2. Description of "Child Feeding Questionnaire" subscales

Subscale	Description
Concern over the Child's Weight (W)	Assesses parents' concern about their child's risk of being overweight.
Child's Perceived Weight (CPW)	Assesses parents' perception of the child's current state and weight history.
Mother's Perceived Weight (MPW)	Assesses mothers' perception of their own weight history
Perceived Responsibility (PR)	Measures how responsible parents feel they are for their children's nutrition.
Pressure to Eat (PE)	Evaluates parents' tendency to pressure their children to increase their intake
Monitoring (M)	Assesses the degree to which parents monitor their children's diet and restriction
Restriction of foods (R)	Assesses the degree to which parents restrict their children's access to food.

Procedures

Health professionals specialized in childhood eating disorders in Chile were contacted and provided the research team with the contact information of the parents of patients who agreed to participate voluntarily and met the inclusion/exclusion criteria, in order to coordinate the application of questionnaires, after signing the informed consent form. The study was approved by the ethics committee of the *Universidad Adolfo Ibáñez*.

The method of ARFID classification subtypes was performed according to the diagnosis given by the treating professionals, considering the following DSM-5 criteria: (1) Limited appetite: Those children who do not eat enough and show some disinterest in food intake, (2) Selective eating: Children who eat an inadequate variety of foods as a result of a sensory aversion to the texture, taste, temperature, or presentation of the food, and (3) Fear of feeding: Those children who after some traumatic experience with feeding (vomiting, use of tubes, gagging, or pain), present persistent food refusal.

Design and analysis

Quantitative, exploratory, correlational, non-experimental, cross-sectional study. The purposive sampling method used was.

Descriptive statistics were used for data analysis. For the evaluation of the associations between the variables (a) child eating behavior and (b) parental eating strategies, Spearman's and Kendall's Tau-b correlation were used, after verifying that the variables did not present normal distributions, according to the K-S Kolmogorov Smirnov test³², using the SPSS version 25 statistical software. An alpha of 0.05 was considered.

The study hypotheses were: (1) In parents with children diagnosed with ARFID, control feeding strategies would predominate, specifically Pressure to eat (PE), Monitoring of intake (M), and Restraint (R), and (2) Parental use of control eating strategies would be associated with food refusal behaviors.

Results

Characteristics of children

The age ranged from 4 to 10 years (Mean = 6.29; SD = 2.05); 16 were males (66.7%) and 8 females (33.3%); 5 lived with both parents (20.8%), 16 with parents and siblings (66.7%), and 3 with grandparents and parents (12.5%). 50% were under medical treatment and 33.3% had a family history of obesity and/or an eating disorder at the time of ARFID diagnosis. A sample of 30 participants was contemplated, however, three participants did not meet the inclusion criteria, and three refused to participate in the study.

With respect to the ARFID subtypes, 50% of the children had selective eating, 29.2% had limited appetite, and 20.8% showed fear of eating.

Regarding the DSM-5 criteria for ARFID, significant interference with psychosocial functioning predominated (87.5%), followed by significant weight loss (58.3%), significant nutritional deficiency (50%), and dependence on enteral feeding (4.2%). In the assessment of the nutritional status of children with ARFID, the subtype selective eating presented a mean z-score of 0.54, limited appetite -0.97, and fear of eating -3.95. These differences were statistically significant ($F_{2,1.2} = 9.89$, $gI = 21.2$; $p < 0.001$), specifically between the limited appetite and selective eating groups and the fear of eating group which presented lower Z-score values.

Characteristics of the caregivers

Ages ranged from 27 to 48 years ($M = 34.4$; $SD = 5.00$). 19 mothers (79.2%) and 5 fathers (20.8%) participated, 70.8% were married or living with a partner, 20.8% were single, and 8.3% were divorced. Half of the sample belonged to the middle SES, 7 to the high SES (29.2%), and 5 to the low SES (20.8%). The educational level was distributed as 37.5% with university education, 29.2% with complete secondary education, and 33.3% with technical-professional education. Half reported having a full-time job, while the remaining percentage was distributed among part-time, flexible hours, and homemakers.

Descriptive tests for parents' perception of parental strategies used during mealtimes (CFQ) and perception of their child's eating behavior (CEBQ)

When assessing the perceptions, beliefs, and concerns of the parents regarding their children's eating, most showed perceived responsibility towards their eating ($M = 4.43$; $SD = 0.56$). Regarding the eating strategies referred by parents, the highest scores were observed in monitoring food intake ($M = 3.98$; $SD = 0.96$), followed by pressure to eat ($M = 3.57$; $SD = 0.89$), and food restriction ($M = 3.04$; $SD = 0.90$) (Table 3).

In relation to children's eating behavior, most were grouped in the dimension of negative approach to food, with greater satiety response ($M = 3.55$; $SD = 0.85$), slowness to eat ($M = 3.2$; $SD = 1.11$), and emotional underfeeding, that is, reduced intake during negative emotional states ($M = 3.13$; $SD = 0.68$), with a considerable increase in the variable food refusal ($M = 4.3$; $SD = 0.61$) (Table 4).

The child eating behaviors that were least prevalent were emotional overeating ($M = 1.84$; $SD = 0.72$) and response to food ($M = 2.0$; $SD = 0.77$) (Table 4).

Descriptive data according to ARFID subtype and use of parental strategies during feeding

In parents with children with limited appetite, it was

observed more frequently that they perceived themselves as highly responsible for their children's eating ($M = 4.5$; $SD = 0.46$), and the commonly used eating strategy was intake monitoring ($M = 3.8$; $SD = 0.92$), while parents of children with fear of eating used pressure to eat ($M = 3.9$; $SD = 0.94$) and intake monitoring ($M = 3.8$; $SD = 1.30$). Notably, in children with fear of eating, there is a greater satiety response ($M = 4.1$; $SD = 0.96$), slowness to eat ($M = 3.5$; $SD = 1.41$), emotional undereating ($M = 3.7$; $SD = 0.39$), and food refusal ($M = 4.4$; $SD = 0.59$) compared with the other two ARFID subtypes. Finally, in parents of children with selective intake, intake monitoring ($M = 4.1$; $SD = 0.87$) mainly predominated, followed by restriction of the child's preferred foods ($M = 3.3$; $SD = 0.75$).

It should be noted that none of the differences between the groups were statistically significant.

Relational analysis

There were associations between the variables (a) child eating behavior, measured with the CEBQ, and (b) parental eating strategies, measured with the CFQ.

Direct correlations were observed between the parental strategy of pressure to eat with emotional underfeeding ($r = 0.411$; $p = 0.046$), satiety response ($r = 0.575$; $p = 0.003$), slowness to eat ($r = 0.487$; $p = 0.016$), and food refusal ($r = 0.474$; $p = 0.019$). The tendency of parents to pressure their children to eat was inversely correlated with the subscales of response to food ($r = -0.695$; $p < 0.001$), emotional overeating ($r = -0.729$; $p < 0.001$), and food enjoyment ($r = -0.748$; $p < 0.001$). That is, pressure to eat was significantly related to less enjoyment of food by the child, less response to food, such as lack of response to external food cues (smell and/or appearance), and less overeating associated with negative emotions by the child.

The food restriction subscale was directly associated with the CEBQ subscales response to food ($r = 0.414$; $p = 0.044$) and emotional overeating ($r = 0.409$; $p = 0.047$). In addition, dietary restraint showed a direct correlation with the subscale concern for the child's weight, both measured by the CFQ, that is, the greater use of the food restriction strategy, the greater the concern about the child's weight ($r = 0.610$; $p = 0.002$).

Thus, two subscales that are related to parental use of control eating strategies, specifically pressure to eat and food restriction, presented statistically significant associations with those subscales of child eating behavior linked to a negative approach to food, that is, satiety response, slowness to eat, emotional undereating, and food refusal (Table 5).

When relating the child's nutritional status, a nonlinear interaction was observed between Z-score

Table 3. Descriptors for parental feeding strategies by variable and dimension

Variable	MIN	MAX	AVG	SD
Food perceptions				
Perceived Responsibility	3.3	5.0	4.431	0.5602
Mother's weight	2.5	3.8	3.271	0.3120
Child's weight	0.5	2.7	1.806	0.6092
Concern over Child's weight	1.0	5.0	2.542	1.2151
Parental Strategies				
Restriction of foods	1.1	5.4	3.047	0.9005
Pressure to Eat	2.3	5.0	3.573	0.8983
Monitoring of intake	2.0	5.0	3.986	0.9554

Table 4. Descriptors for feeding behavior by variable and dimension

Variable	MIN	MAX	AVG	SD
Positive approach to food				
Food Responsiveness	1.0	3.6	2.0	0.7712
Emotional overeating	1.0	3.4	1.849	0.7232
Enjoyment of food	1.0	4.0	2.367	0.7705
Desire to Drink	1.0	5.0	2.889	1.1019
Negative approach to food				
Satiety responsiveness	1.6	5.0	3.550	0.8572
Slowness in Eating	1.3	5.0	3.271	1.1130
Emotional undereating	2.0	4.3	3.135	0.6875
Fussiness	3.0	5.0	4.354	0.6184

and concern for the child's weight ($\tau_{\text{Kendall}} = 0.310$; $p = 0.040$). That is, the greater the concern for the child's weight, the higher the Z-score ($r = -0.412$; $p = 0.045$).

Discussion

We found that parental feeding strategies are associated with food refusal behaviors in children with ARFID. Specifically, the strategy of pressure to eat is related to greater emotional underfeeding, satiety response, slowness to eat, and food refusal. This is consistent with other research where parents use pressure to eat, monitoring of intake, or offer a narrower range of foods due to persistent rejection of new foods by the child and as an effort to encourage variety in the foods presented to her/him¹⁹.

Previously, Rolls, Rolls, Rowe, and Sweeney³³ already argued how child eating behavior of satiety response may prevent parents from exposing their children to different types of foods. Similarly, it was ob-

Table 5. Correlation between parental strategies and child eating behaviors

Parental Strategies	Child Eating Behavior							
	Food Responsiveness	Emotional overeating	Enjoyment of food	Desire to Drink	Satiety responsiveness	Slowness in Eating	Emotional undereating	Fussiness
Perceived Responsibility	r = -0.101 p = 0.639	r = -0.086 p = 0.690	r = -0.195 p = 0.360	r = 0.094 p = 0.662	r = 0.404 p = 0.050	r = 0.028 p = 0.898	r = 0.237 p = 0.266	r = 0.388 p = 0.061
Perception of mother's weight	r = -0.051 p = 0.813	r = 0.020 p = 0.926	r = -0.210 p = 0.324	r = 0.086 p = 0.690	r = 0.132 p = 0.539	r = 0.073 p = 0.734	r = -0.019 p = 0.931	r = 0.269 p = 0.204
Perception of child's weight	r = 0.265 p = 0.211	r = 0.345 p = 0.099	r = 0.175 p = 0.413	r = -0.142 p = 0.509	r = -0.350 p = 0.094	r = -0.163 p = 0.447	r = -0.298 p = 0.158	r = -0.130 p = 0.544
Concern over child's weight	r = 0.433 p < 0.05	r = 0.410 p < 0.05	r = 0.275 p = 0.193	r = 0.214 p = 0.316	r = -0.111 p = 0.605	r = -0.186 p = 0.384	r = 0.061 p = 0.777	r = 0.204 p = 0.339
Restriction of foods	r = 0.414 p < 0.05	r = 0.409 p < 0.05	r = 0.167 p = 0.435	r = 0.250 p = 0.239	r = 0.036 p = 0.869	r = 0.001 p = 0.997	r = -0.024 p = 0.911	r = 0.328 p = 0.118
Pressure to Eat	r = -0.695 p < 0.05	r = -0.729 p < 0.05	r = -0.748 p < 0.05	r = -0.304 p = 0.148	r = 0.575 p < 0.05	r = 0.487 p < 0.05	r = 0.411 p < 0.05	r = 0.474 p < 0.05
Monitoring of food intake	r = 0.039 p = 0.856	r = 0.039 p = 0.856	r = -0.069 p = 0.748	r = 0.014 p = 0.948	r = -0.043 p = 0.843	r = 0.363 p = 0.082	r = 0.034 p = 0.874	r = 0.089 p = 0.679

served that the greater the pressure exerted by parents, the lower the child's enjoyment of food and responsiveness and/or interest in food. This is in line with Kroller, Jahnke, and Warschburger¹⁸ in relation to the counterproductive effect that pressure to eat could have on the reduction of the child's enjoyment of food, which could also influence the decrease in food intake, perpetuating the child's avoidance behaviors towards food. Thus, when the child is pressured to eat, at the same time she/he experiences a dislike of that food, and the anxiety response is likely to increase, which may lead to food aversion¹⁰.

In this study, it was observed that the use of the parental strategy of food restriction is related to the child's response to food and emotional overeating, and pressure to eat is related to the response to food and underfeeding associated with negative emotions. In this sense, but related to emotional regulation, our findings suggest that eating strategies related to parental control in children diagnosed with ARFID may decrease or increase the child's food intake when facing negative emotional states depending on the parental strategy used. Therefore, it would be interesting to investigate the relationship between food in children diagnosed with ARFID and emotional regulation since several authors have already described the relationship between child eating behavior and emotional regulation^{17,34,35} and, especially in children with ARFID, it has been suggested that parental pressure to eat may contribute to the dissociation of hunger/satiety signals, as well as to abnormal eating habits due to extrinsic reasons such as emotions³⁶.

Similarly, the study suggests that parental dietary restraint is related to concerns about the child's eating and body weight. This is consistent with the literature¹⁵ where parents are more likely to exert high levels of external control over their child's feeding behavior when they are concerned about their child's perceived underweight¹⁵.

Another of our findings is in relation to the ARFID subtype fear of eating, where children would present greater satiety response, slowness to eat, emotional underfeeding, and food refusal, and parents tend to use pressure eating strategies. This category is important as an appropriate psychological and psychiatric evaluation is especially necessary. Milano et al. have proposed red flags in different areas as one of the strategies for dealing with this diagnosis which includes identifying a trigger for the change in eating behavior, as well as the presence of anxiety and phobic symptoms throughout life³⁷. Early detection and parental psychoeducation towards sensible eating and the effects of pressure to eat could decrease or prevent such eating behaviors¹.

This study shows significant associations between parental restriction and pressure to eat and food refusal in children diagnosed with ARFID, but they do not allow us to establish the direction of this association. However, we cannot suggest that parental feeding strategies could be determinant in maintaining and/or facilitating the child's food refusal behavior. Even more so when there is no national evidence in this regard.

Finally, the limitations of this study include that, as the data are cross-sectional, it is not possible to establish cause-and-effect hypotheses, nor to observe the

processes of formation of both eating strategies and eating behavior. As self-administered questionnaires were used, parents may have manipulated their responses to reflect desirable and culturally appropriate behaviors.

Future research must examine the role of family functioning, which is important to better understand the use of certain parental strategies over others and whose relevance is described by other researchers³⁸.

Conclusions

The objective of this study was to evaluate the association between parental feeding strategies and food refusal behavior in children with ARFID. As in other investigations^{39,40}, an association was observed between the parental feeding strategy of pressure to eat and child food refusal behavior. At the same time, parental strategies of pressure to eat and food restriction were correlated with a lower response to food by the child.

In addition, the eating behaviors frequently perceived by parents with children diagnosed with ARFID are those related to the negative approach to food, such as satiety response, food refusal, slowness to eat, and emotional underfeeding.

Ethical Responsibilities

Human Beings and animals protection: Disclosure the authors state that the procedures were followed according to the Declaration of Helsinki and the World Medical Association regarding human experimentation developed for the medical community.

Data confidentiality: The authors state that they have followed the protocols of their Center and Local regulations on the publication of patient data.

Rights to privacy and informed consent: The authors have obtained the informed consent of the patients and/or subjects referred to in the article. This document is in the possession of the correspondence author.

Conflicts of Interest

Authors declare no conflict of interest regarding the present study.

Financial Disclosure

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