HHS Public Access

Author manuscript

Int J Eat Disord. Author manuscript; available in PMC 2020 April 01.

Published in final edited form as:

Int J Eat Disord. 2019 April ; 52(4): 402–409. doi:10.1002/eat.23016.

Further support for diagnostically meaningful ARFID symptom presentations in an adolescent medicine partial hospitalization program

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Abstract

Objective: To identify potential presentations of avoidant/restrictive food intake disorder (ARFID) in a pediatric eating disorder partial hospitalization program (PHP) based on the nature of the eating restriction leading to core symptoms of ARFID.

Method: A retrospective chart review of 83 patients ages 8–17 admitted to a PHP and diagnosed with ARFID. Charts were independently reviewed by two coders, with high inter-rater agreement ($\kappa = 0.77$). Distinct categories were identified and groups were compared on demographics, anthropometrics, comorbid psychopathology, and core ARFID symptoms.

Results: We identified cases characterized by predominantly selective eating based on aversions to the sensory properties of foods, lack of interest in eating/low appetite, and fear of aversive consequences from eating. We also distinguished a subset of patients with eating restrictions consistent with both selectivity and limited interest/appetite. The four primary ARFID presentation groups differed on core ARFID criteria, symptom trajectory and illness duration, mood and medical comorbidities, age, gender, and parent-reported symptoms of psychopathology.

Discussion: The present findings suggest that there are diagnostically meaningful ARFID subtypes that can be differentiated based on the nature of their eating restrictions, as well as other demographic, illness history features, and psychiatric comorbidity. As treatments for youth with ARFID are developed and refined, it will be important to take into consideration not only demographic differences, but also the variability in symptoms, as this might require distinct interventions and levels of care. Additionally, differing mechanisms that maintain different types of eating restrictions might necessitate unique psychological and psychiatric interventions.

Keywords

appetite; ARFID; avoidant/restrictive food intake disorder; choking phobia; partial hospitalization; picky eating; selective eating; vomit phobia

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1 | INTRODUCTION

Although the avoidant/restrictive food intake disorder (ARFID) diagnosis captures a heterogeneous array of eating symptoms, there is virtually no empirical data on the distinctness of these presentations from one another, their prevalence in treatment settings, or their usual trajectory and clinical presentation (Thomas et al., 2017). Three patterns of restrictive eating that can lead to inadequate intake are described in the DSM-5: (a) extreme selectivity about foods based on their sensory properties (e.g., “picky eating” or food neophobia); (b) limited interest in eating or poor appetite; and (c) fear of aversive consequences from eating (e.g., choking or vomiting). There is a need to more clearly delineate the eating restrictions that can cause ARFID symptoms, as a first step toward a clearer understanding of their etiology and maintenance. This research would help to inform the development and refinement of evidence-based interventions for ARFID.

Across samples from four retrospective chart reviews conducted in adolescent medicine eating disorder settings, ARFID patients differ from other eating disorder patients on demographic and clinical variables: they are younger, more likely to be male (although the majority are still female), more likely to have anxiety disorders and comorbid medical conditions, and less likely to have a mood disorder (Fisher et al., 2014; Forman et al., 2014; Nicely, Lane-Loney, Masciulli, Hollenbeak, & Ornstein, 2014; Norris et al., 2014). In several of these chart reviews, authors noted a diverse array of features related to restrictive eating in ARFID patients, including: history of picky eating, texture or sensory aversions, fear of vomiting or choking, food allergies, abdominal pain or nausea, anxiety impacting eating, and medical conditions affecting eating or appetite (Fisher et al., 2014; Nicely et al., 2014; Norris et al., 2014).

Although there is consistency across chart reviews in reporting these diagnostic features, only one other group to date has attempted to classify ARFID patients into discrete diagnostic categories based on the features of restrictive eating. Norris et al. (2018) recently published a retrospective chart review of 77 ARFID cases, in which they found support for the three descriptive ARFID presentations noted in the DSM-5: extreme selectivity, limited interest in eating or poor appetite, and fear of aversive consequences from eating (APA, 2013). These three diagnostic subgroups were similar on many clinical characteristics, including age, body mass index (BMI) *z*-score, and gender, but differed on initial level of care recommended and duration of illness. Individuals with the fear presentation were more likely than those with the selective or appetite presentations to be admitted to the hospital at intake, and those with the selective presentation had a longer illness duration than those with the fear presentation.

While information on demographics, BMI, recommended level of care, and illness duration provide an important first step in understanding differences between proposed ARFID presentations, additional research is clearly warranted. It appears likely that these three different patterns of eating behavior have distinct risk factors, etiologies, and maintaining mechanisms. Clarifying the clinical characteristics of ARFID patients categorized according to the primary eating restriction driving their weight, nutritional, and/or psychosocial symptoms is an important step toward better understanding the mechanisms of these three

patterns of restrictive eating, and the potentially differing treatment requirements for these patients. No published study to date has examined differences between patients with distinct ARFID presentations using psychometrically tested measures of psychopathology. The purpose of the current study is to compare different presentations of ARFID in young patients in an intensive family-centered and exposure-oriented eating disorders PHP. We hypothesize that we will reliably identify subgroups of patients based on the three proposed types of restrictive eating: extreme selectivity/neophobia, limited appetite/interest in eating, and fear of aversive consequences from eating. Exploratory analyses will compare identified subgroups on clinical characteristics.

2 | METHODS

2.1 | Participants

A retrospective chart review was performed on all patients ages 8–17 diagnosed either prospectively since 2013 or retrospectively (from 2008 to 2012) with ARFID ($n = 83$). For the retrospectively diagnosed participants, the diagnosis was conferred using a checklist of DSM-5 eating disorder symptoms as described in Nicely et al., 2014. Patients treated between August 2008 and September 2016 were included in previous chart review studies by our group that compared ARIFD patients to those with other eating disorders (Nicely et al., 2014), and presented treatment outcomes for ARFID patients (Ornstein, Essayli, Nicely, Masciulli, & Lane-Loney, 2017). This is the first study by our group to categorize these patients according to potential ARFID presentations.

2.2 | Presentation coding

Charts were independently reviewed by two coders (HZ and SL). Documents examined included psychiatric, adolescent medicine, nutrition, and psychological evaluations and progress notes, as well as discharge summaries. The categories were informed by those described in the DSM-5 and identified in a different sample of ARFID patients treated in another adolescent medicine setting (Norris et al., 2018): extreme selectivity due to aversions to the sensory properties of food, low appetite or apparent lack of interest in eating, and avoidance of eating due to fear of negative consequences. The coders used a checklist of clinical features (see Appendix) based on the descriptive features of ARFID identified in previous chart reviews by our group (e.g., Nicely et al., 2014). This checklist included factors associated with the onset of eating restrictions. After reviewing each patient's chart and completing the checklist, the raters independently categorized each patient into a primary ARFID subtype according to the symptoms endorsed on the checklist and the rater's clinical judgment. During the coding process it became clear that the majority of patients who were identified as having an extremely narrow range of accepted foods also had significant appetite disturbances that contributed to their ARFID symptoms; we coded such participants as having “Co-primary” appetite disturbance/selectivity. In contrast, none of the patients with a primary fear presentation exhibited co-primary selectivity or low appetite.

Cases that did not fit into these four categories (i.e., appetite disturbance, selectivity, co-primary appetite disturbance/selectivity, and fear)—such as those who demonstrated healthy

eating preoccupation more consistent with orthorexia (e.g., Dunn & Bratman, 2016) or a blend of ARFID and AN symptoms (e.g., cases with some indications that desire for thinness or body image distortion might have contributed to the eating restriction, even in the context of the restrictions described above)—were coded into a fifth "other disordered eating" category and subsequently excluded from analyses comparing ARFID subtypes. Disagreements between raters were resolved via consensus coding conducted by JE and RO. All four coders were involved in patient care: SL and RO were involved in the treatment of all patients included in the chart review, whereas JE and HZ were involved with those treated after July 2016 and July 2017, respectively.

2.3 | Measures

2.3.1 | Demographics and anthropometrics—Information gathered at intake included age, gender, height, weight, and percent of body weight lost. Degree of weight loss was determined from patient report, parent report, and/or prior medical and school records. BMI was calculated using the standard formula (kg/m^2) and the percent median body weight (%MBW) was determined based on the 50th percentile BMI-for-age using the 2000 Centers for Disease Control and Prevention growth charts (www.cdc.gov/growthcharts). Duration of illness was defined as weeks during which the core symptoms of ARFID (e.g., weight loss, nutritionally inadequate diet) were present, rather than the duration of the underlying eating disturbance (e.g., moderate picky eating).

2.3.2 | Comorbid diagnoses—A program psychologist, social worker, and/or psychiatrist diagnosed comorbid psychopathology (e.g., mood disorders, anxiety disorders, obsessive compulsive disorder (OCD), and attention deficit/hyperactivity disorder [ADHD]) during two hour-long evaluations with patients and parents. Interviews were guided by semi-structured interviews and prompts corresponding to diagnostic criteria for these disorders, and the same three providers either conducted interviews or supervised psychiatry residents and psychology interns who conducted interviews. Patients' records were reviewed for historical diagnoses of autism spectrum disorder or other developmental disabilities; patients and families were also asked about historical diagnoses during the diagnostic interview, and the semi-structured interview included screening questions for potentially unrecognized developmental symptoms. Comorbid medical diagnoses were coded from patients' charts or given at intake by the program adolescent medicine physician, who also interviewed families about historical medical diagnoses.

2.3.3 | Core ARFID symptoms—The Criterion A symptoms, each of which alone is sufficient for the ARFID diagnosis are: (a) weight loss or growth faltering, (b) nutritional deficiency, (c) dependence on supplements or enteral feeding for nutrition, and (d) psychosocial interference (APA, 2013). At intake, physicians and nutritionists interviewed families and reviewed outside records to determine whether the child had a history of poor or slow growth and/or whether there had been acute weight loss since the onset or worsening of eating restrictions. Four variables were used to assess the presence and absence of the weight and nutritional symptoms of ARFID: acute weight loss, long-term growth-faltering, inadequate nutrition, and dependence on oral or enteral supplements. Weight loss and/or growth faltering were judged to be significant by the adolescent medicine physician;

generally, any weight loss in a prepubescent child, and weight loss that involved crossing a growth percentile line in an adolescent, were considered significant. Supplement dependence was based on the use of supplements to replace calories and/or nutrients that the patient was unable to obtain from food or, augment small or nutritionally inadequate meals. Patients who were prescribed supplements after the intake as part of treatment were not included in the "supplement dependent" category at intake. Psychosocial interference was not formally assessed, but patients were considered to meet these criteria by seeking or being referred to care at the PHP level as a proxy for family and child interference, distress, and impairment.

2.3.4 | Achenbach child behavior checklist (CBCL)—The CBCL is a 113 item parent report measure designed to describe behaviors associated with clusters of clinical psychiatric symptoms. The measure was normed with children ages 6–18 years. The measure yields broad Externalizing and Internalizing scores and eight Syndrome Scores. The subscales used in the present study were Affective, Anxiety, Somatic, and ADHD problems. Subscales are expressed as *t*-scores (Mean = 50; SD = 10). Scores of 65 or higher are considered to be significantly elevated (Achenbach & Rescorla, 2001). The scales and clinical cutoffs have shown good internal consistency and criterion-related validity in screening for affective, anxiety, somatic, and attention disorders in previous samples (e.g., Ebesutani et al., 2010).

2.4 | Data analysis

Reliability for the primary subtype coding was computed using Cohen's κ. A κ coefficient ranging from 0.60 to 0.80 represents substantial inter-rater reliability, reflecting percentage agreement taking into account the probability of chance agreement (Landis & Koch, 1977). The ARFID subtype groups were compared on gender, age group, ARFID criteria met, and presence of comorbidities using likelihood ratio chi-square tests with Cramer's V-type effect sizes, and on age, %MBW, and CBCL scales using one-way ANOVA with partial η^2 effect sizes. Missing data on %MBW and self-report measures were deleted casewise. For chi square analyses, given our relatively low power, and to reduce the number of hypothesis tests conducted, we did not conduct post hoc comparisons between two groups when overall significant differences were observed, although we describe visual trends. When the groups were compared using ANOVA, we conducted post hoc significance tests to explore significant overall group differences. For the CBCL subscales, one-sample *t* tests were used to determine whether each subtype group mean was significantly greater than 65, the clinical severity threshold. We used the pwr package for R to conduct post hoc power analyses for ANOVA with four unequal group sizes (Champely et al., 2018; Cohen, 1988). Power to detect small ($\eta^2 = 0.02$) and medium ($\eta^2 = 0.08$) effects was low: 15.9% and 59.7%, respectively. However, there was near-adequate power to detect large ($\eta^2 = 0.15$) effects: 83.5%.

3 | RESULTS

3.1 | ARFID subtypes

Of the 98 patients whose charts were reviewed, five were coded as having only selective eating (5.1%: Selective), 19 (20.4%) were coded as having both selective eating and appetite

disturbance (Co-Primary), 11 (11.2%) were coded as having primary appetite disturbances (Appetite), 48 (49.0%) were coded as having primary fear (Fear), and 15 (16.1%) were determined to have symptoms of eating disorders other than ARFID. Substantial inter-rater reliability ($\kappa = 0.77$) was found for the five categories coded.

3.2 | Descriptive psychopathology and factors associated with onset

Of the 48 Fear presentation patients, 24 had primary choking fears (51.0%), 21 had primary vomiting fears (44.7%), and 3 had other fears (6.3%; e.g., contamination by allergens, abdominal pain). Most (69.5%) reported a specific incident associated with the onset of fear-related eating restrictions, including an episode of vomiting or choking, seeing another person vomit or choke, or experiencing nausea or difficulty swallowing.

Of the 19 Co-Primary patients, 16 (84.2%) reported a chronic course of poor appetite and lack of interest in food; in most cases, the onset was by age six. Four of 11 Appetite-only patients reported chronic symptoms (36.4%). A majority of the patients (81.8%) with only Appetite symptoms reported that their appetite loss and lack of interest in eating developed after a stressor or in the context of mood/anxiety symptoms, with the remainder reporting a more chronic course. Five Co-Primary patients (26.3%) reported exacerbation of appetite or selectivity symptoms, whereas 73.7% reported a chronic course. One of five Selective patients reported increased selectivity in the context of anxiety (20.0%), but all reported longstanding selectivity.

3.3 | Demographic characteristics

The overall sample was 76% female, with a mean age of 11.38 years; 78.3% were 12 or younger. A higher proportion of male patients had the Co-Primary and Appetite presentations, and patients with the Appetite presentation tended to be older, with the majority aged 13 or older (Table 1).

3.4 | Core ARFID symptoms

As noted in Table 1, patients with primary Fear and Appetite presentations appeared to be more likely to have recently lost weight and to be supplement dependent than those with the Selective and Co-Primary presentations, with significant overall group differences on each variable. The groups also differed significantly on proportion with a history of slow/poor growth, with patients with the Co-Primary presentation exhibiting a higher prevalence of slow/poor growth (Table 1). The groups did not differ on proportion diagnosed as having a nutritionally deficient diet at intake.

There were no significant differences among the groups in percent of bodyweight lost during the illness or %MBW at intake. The groups differed significantly on duration of illness (defined as weeks with clinically significant ARFID symptoms). Co-Primary patients reported a significantly longer illness duration than any other group (see Table 2).

3.5 | Comorbid symptoms and diagnoses

The groups were not significantly different with respect to presence of a comorbid anxiety disorder or developmental delay. There was an association with medical comorbidities and

mood disorder, with higher proportions among patients with the Appetite presentation, and ADHD diagnosis, with a lower prevalence in patients with the Fear presentation (Table 3). Gastrointestinal symptoms, including gastroesophageal reflux, early satiety, nausea, gastroparesis, and abdominal pain, were the most commonly reported medical comorbidities, reported by 63.6% of Appetite patients, 47.4% of Co-Primary patients, 20.0% of Selective patients, and 18.75% of Fear patients. Other medical comorbidities included: asthma/reactive airway disease ($n = 4$), cerebral palsy/ambulatory dysfunction (3), amplified musculoskeletal pain syndrome ($n = 2$), seizure history ($n = 2$), eczema, juvenile rheumatoid arthritis, Lyme disease, Ehlers-Danlos syndrome, tetralogy of Fallot, interstitial cystitis, and scoliosis (all $n = 1$).

Similar results emerged when the CBCL was compared across and between groups using post hoc significance tests (Table 4). The Appetite participants' mean CBCL *t*-scores were significantly elevated for Anxiety and Affective problems; there was also a trend-level elevation for Internalizing symptoms. The Selective and Co-Primary participants had the same pattern of elevations on the CBCL mean *t*-scores, with significantly elevated scores in Internalizing, Anxiety, and Affective Problems. Fear participants did not have clinically elevated mean CBCL scores on any scale other than Anxiety problems, and their mean *t*-scores for Internalizing, Externalizing, and ADHD problems were significantly lower than two of three other groups.

4 | DISCUSSION

To the best of our knowledge, this is the first study in a PHP sample to explore differences between potential ARFID subtypes using psychometrically tested measures of psychopathology, and the second to compare groups on clinical features extracted from a retrospective chart review. Consistent with the findings from Norris et al. (2018), we found evidence of satisfactory inter-rater reliability for ARFID presentations characterized by fear of aversive consequences, highly selective eating/food neophobia, and low appetite/lack of interest in eating. We also observed co-occurrence of interfering symptoms of selectivity and low appetite/limited interest in eating. These findings support the hypothesis that ARFID encompasses several distinct but overlapping clinical presentations (Thomas et al., 2017). At the same time, our results indicate that ARFID subgroups exhibit differences on various clinical and demographic variables, suggesting that distinct etiological and maintenance factors may be associated with different restrictive eating patterns. Given the retrospective nature of the present study, it is possible that we failed to capture the true degree of symptom overlap between ARFID subgroups, as evaluators did not prospectively assess for the presence and absence of these eating restrictions in a systematic fashion. Future research utilizing prospective designs and standardized assessment methods exploring the degree of symptom overlap across ARFID presentations is clearly warranted.

Our findings converge with those of Norris and colleagues to suggest that in a PHP setting, the Fear presentation of ARFID is characterized by a severe, acute onset of symptoms in younger children with a previous history of normal growth, presenting with minimal psychological comorbidity other than anxiety, usually following first- or second-hand exposure to choking or vomiting. The female predominance in this subsample is consistent

with the higher prevalence of anxiety disorders in general among girls in childhood (Lewinsohn, Gotlib, Lewinsohn, Seeley, & Allen, 1998; Merikangas et al., 2010). Anxious children might be at higher risk for developing specific phobia and behavioral avoidance (e.g., eating restrictions) following exposure to choking or vomiting incidents that other children might not experience as traumatic, perhaps because of the enhanced susceptibility to both fear conditioning and conditioned responding to fear cues associated with anxiety disorders (e.g., Duits et al., 2015; Lissek et al., 2005; Thomas et al., 2017; Waters, Henry, & Neumann, 2009).

Primary Selectivity was the least common presentation in our population, with just 5% of patients meeting ARFID criteria due to selective eating alone. Norris et al. (2018) also found that this presentation had the lowest prevalence in their clinic population. While these findings may indicate that the Selective presentation without co-occurring appetite disturbance is the least common of the three putative ARFID presentations, it appears likely that these two studies have disproportionately sampled patients with more severe symptoms, particularly at our intensive PHP (Norris and colleagues' 2018 ARFID sample was drawn from all levels of care, including outpatient, partial hospitalization, and inpatient treatment). None of the five selective eaters in our sample presented with clinically significant weight loss or a history of growth faltering, which is consistent with research in nonclinical samples suggesting that selective eating is not consistently related to weight (Brown et al., 2018). Highly selective eaters with normal weight would meet ARFID criteria if there was significant psychosocial disturbance, dependence on supplements, or if nutritional deficiencies (e.g., anemia, low serum Vitamin D) were detected upon medical evaluation. However, referral to an adolescent medicine eating disorder setting like ours might be less likely for such patients, due to their normal weight and growth. In our own institution, highly selective eaters are usually referred to the Feeding Program housed in the Division of Pediatric Gastroenterology.

Compared to the primary Appetite group, patients with Co-Primary selective eating and appetite disturbance were less likely to report a specific inciting event that triggered or exacerbated the appetite disturbance. Because almost all reported an early onset and chronic course of both selective eating and appetite disturbances, it was not surprising that they were more likely than the other groups to meet ARFID criteria based on long-term growth faltering and were less likely to present with clinically significant acute weight loss. In contrast, most Appetite-only patients did not have a longstanding history of appetite disturbance, but rather experienced acute onset of appetite disturbance due to a stressor, depressed mood, and/or anxiety symptoms. More than half also reported gastrointestinal symptoms that contributed to appetite disturbances and/or a lack of motivation to eat. High rates of comorbid medical diagnoses, ADHD symptoms, and mood symptoms may also have contributed to appetite loss related to medication side effects (e.g., appetite suppression due to simulants; all patients with an ADHD diagnosis entered treatment on stimulant medication), the effect of medical illnesses on appetite, or appetite loss in the context of depression.

Thomas et al. (2017) hypothesize that inadequate intake in ARFID is related to inappropriate homeostatic regulation. While this theory is consistent with the chronic low appetite and

limited motivation to eat seen in our Co-Primary patients, homeostatic dysregulation seems less likely to be related to the acute onset of appetite restriction observed in the Appetite-only subgroup of patients. Although it is possible that these patients had longer-standing homeostatic dysregulation that they were able to compensate for prior to the onset of psychopathology, stress, or illness, a different mechanism might account for the etiology of more acute changes in appetite. Deficits in reward sensitivity have been implicated in other eating disorders, particularly restricting AN (e.g., Harrison, O'Brien, Lopez, & Treasure, 2010), as well as in mood disorders (Eshel & Roiser, 2010). Relatively abrupt onset of disinterest in eating may be related to impaired responsiveness to the rewarding properties of food and/or the negative reinforcement of eating when hungry. Whether impaired reward processing is explained by comorbid mood symptoms, or is a shared vulnerability factor, is an important area for future investigation.

Although this study has many strengths, including the relatively large, well-characterized ARFID sample, the use of psychometrically validated symptom measures, and the high degree of inter-rater reliability in identifying ARFID cases, there are limitations that deserve mention. There was relatively low statistical power to detect small continuous differences among our four groups, particularly given the small size of the primary Selective group. Some of the nonsignificant differences, including those related to acute weight loss and %MBW, were associated with medium effect sizes. Future research on ARFID symptom presentation should continue to explore the variability in acute weight loss and longer-term nutritional/growth status.

Another limitation is the lack of adequate measures to assess for symptoms of ARFID. Prior to the introduction of the ARFID diagnosis in DSM-5, our clinicians might not have reliably assessed for eating disturbances consistent with the diagnosis, particularly selective eating. An operationalization of picky eating has only recently emerged in research and literature reviews and in the text of DSM-5 (e.g., Taylor, Wernimont, Northstone, & Emmett, 2015). Prior to 2013, therefore, our assessments of selective eating, in addition to being somewhat inconsistently applied, might not have included the same questions or definition of picky eating. This limitation meant that we were unable to code charts for the presence of subclinical ARFID eating presentations, as only the eating restrictions that contributed to significant ARFID symptoms, as denoted by Criterion A, were consistently assessed. Future studies should aim to clarify whether there is indeed greater overlap between the selectivity and appetite disturbance eating restrictions, and the degree to which the fear of aversive consequences subgroup represents a more distinct clinical presentation. This line of inquiry may have implications for the development of treatment for ARFID, as it is currently unclear whether or not the three ARFID presentations would benefit from similar or distinct treatment approaches.

We excluded patients who initially received an ARFID diagnosis, but also appeared upon admission to attribute some of their eating restrictions to symptoms of other eating disorders, such as body image disturbances, positive feelings about weight loss, rigid eating patterns related to healthy eating, and body dissatisfaction. Given the high prevalence of certain subclinical eating disorder symptoms in the general population, such as fear of certain foods, drive for thinness, and body dissatisfaction (Gonzalez & Vitousek, 2004; Karazsia, Murnen,

& Tylka, 2017), it may be important for researchers and clinicians to be careful when differentiating between ARFID and other eating disorder diagnoses, especially if clinicians are asking these patients about symptoms of other eating disorders as part of a standard evaluation. Eliminating patients whose eating restrictions appeared to be at least partly accounted for by drive for thinness or body dissatisfaction might reduce the generalizability of our findings; the degree to which symptoms of ARFID overlap with symptoms of AN and other eating disorders is not well understood, and is an area for future investigation.

The current findings add to the growing body of literature suggesting that ARFID is a heterogeneous diagnosis that may have clinically distinct, though overlapping, predominant symptom presentations. In two studies conducted at adolescent medicine eating disorder settings, ARFID presentations characterized by fear of aversive consequences, highly selective eating, and appetite disturbance have been identified. Future research should employ psychometric measures that can distinguish between subtypes. We are currently administering the nine-item ARFID screen to all patients in our PHP, which has thus far been validated in a nonclinical sample (Zickgraf & Ellis, 2018). It will be important to continue to develop and refine measures that help distinguish among ARFID presentations, as well as other ED diagnoses. In addition, research in a wider variety of settings and clinical populations should help clarify the relative prevalence of different ARFID presentations, and the degree to which they overlap with one another and with other forms of disordered eating. A better understanding of diagnostic differences among ARFID subtypes will contribute to a greater understanding of the factors associated with risk for, etiology, and maintenance of restrictive eating behaviors not characterized by weight or shape concerns. This will allow researchers to continue to develop and refine targeted treatments for these groups of patients.

APPENDIX

ARFID features checklist used to gather data to guide clinical judgments in assigning predominant ARFID presentations, and descriptive psychopathology regarding factors involved in the onset and maintenance of eating restrictions

- Does the patient refuse a wide range of foods/eats a very small range of food items?
- Does the patient report body shape/weight concerns?
- Did the patient recently lose weight/fail to grow expectedly?
- Describe weight loss (amount and trajectory).
- Did the patient have longstanding issues gaining weight throughout his/her development?
- Does the patient eat less when anxious, stressed, or depressed?
- Was the patient described as picky during development?
- Does the patient avoid foods due to aversions to their sensory features (e.g., texture, color smell, appearance including brand and presentation) or resist trying new foods?

- Does the patient have a fear that s/he will choke when s/he eats?
- Does the patient have a fear that s/he will vomit while or after s/he eats?
- Does the patient have food allergies? If yes, list: If yes, do fears related to food allergies contribute to the eating restrictions?
- Does the patient report abdominal pain or GI problems that contribute to the eating restrictions?
- Does the patient have GI symptoms/diagnosis? If yes, list:
- Does the patient have ear, nose, and throat or speech problems, or a history of ENT/speech testing?

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TABLE 1

Primary ARFID subtype groups: demographics and core ARFID symptoms

	Gender (female)	Age < 13	A1: Weight loss	A1: Growth failure	A2: Restricted nutrition	A3: Supplement dependent
Selective	5 (100%)	4 (80%)	2 (40%)	0 (0%)	4 (80%)	0 (0%)
Co-Primary	11 (57.9%)	14 (73.7%)	11 (57.9%)	7 (36.8%)	17 (89.5%)	3 (15.8%)
Appetite	6 (54.5%)	4 (36.4%)	11 (100%)	1 (9.1%)	11 (100%)	4 (36.4%)
Fear	42 (87.5%)	43 (89.6%)	43 (89.6%)	3 (6.3%)	46 (95.8%)	21 (43.8%)
$\chi^2(3)$	12.11 *	13.40 *	16.70 *	10.78 *	3.37 *ns*	9.33 *
Cramer's *V*	0.37	0.43	0.45	0.38	0.20	0.30

Note. No cases were missing data on these variables.

* $p < .05$.

TABLE 2

Weight loss and ARFID symptom duration: mean (standard deviation)

	%MBW *n* = 83	Acute weight loss as % of bodyweight lost *n* = 66	Duration of ARFID symptoms (weeks) *n* = 82
Selective	95.23 (28.71)	4.64 (5.64)	9.40_a (8.23)
Co-Primary	80.07 (9.55)	6.0 (7.85)	29.39_b (32.94)
Appetite	83.50 (11.36)	9.24 (7.94)	11.36_a (14.54)
Fear	89.51 (16.08)	10.64 (7.89)	6.32_a (12.26)
$F(3, 61–76)$, η^2	2.42, 0.08 †	1.61, 0.07 *ns*	7.94, 0.24 **

Note. Means in same column with different subscripts are significantly different.

Cases with missing data on acute weight loss and symptom duration were deleted casewise. For acute bodyweight loss, Selective $n = 4$, Co-Primary $n = 12$, Appetite $n = 9$, Fear $n = 79$. For illness duration, data were missing for one co-primary patient ($n = 18$) and complete for all other subgroups.

† $p < .08$.

** $p < .001$.

TABLE 3

Comorbid diagnoses at intake

	Medical condition	ADHD	Mood disorder	Anxiety disorder	OCD	Developmental delay
Selective	3 (60%)	1 (20.0%)	2 (40%)	4 (80.0%)	1 (20.0%)	0 (0%)
Co-Primary	5 (26.3%)	5 (26.3%)	3 (15.8%)	15 (78.9%)	0 (0%)	3 (15.8%)
Appetite	9 (81.8%)	4 (36.4%)	8 (72.7%)	5 (45.5%)	3 (27.3%)	0 (0%)
Fear	22 (45.8%)	0 (0%)	4 (8.3%)	37 (77.1%)	13 (27.1%)	3 (6.3%)
$\chi^2(3)$	8.98 *	19.74 **	20.43 **	4.60 *ns*	10.20 *	4.03 *ns*
Cramer's *V*	0.33 *	0.45 *	0.54 **	0.25 *ns*	0.28 *	0.20 *ns*

Note. No cases were missing data on these variables.

* $p < .05$.

** $p < .001$.

TABLE 4

Child behavior checklist *t*-scores: mean (standard deviation)

	Internalizing	Externalizing	ADHD	Somatic	Anxiety	Affective
Selective	**77.20$_{a}$ (8.87)**	62.80$_{a}$ (12.76)	60.80$_{a}$ (9.47)	68.0 (9.47)	**74.0 (3.81)**	**73.60 (6.84)**
Co-Primary	**70.58$_{a}$ (9.23)**	55.47$_{ab}$ (9.91)	62.37$_{a}$ (8.86)	66.16 (10.93)	**69.58 (6.18)**	**70.79 (7.92)**
Appetite	**70.80 $_{ab}$** (8.32)	61.0$_{a}$ (8.69)	56.60$_{ab}$ (8.20)	65.60 (9.58)	**69.90 (5.36)**	**70.30 (7.20)**
Fear	64.28$_{b}$ (11.38)	52.33b (9.74)	53.48$_{b}$ (5.55)	62.54 (9.82)	**67.80 (9.12)**	66.89 (8.60)
$F(3,76)$, η^2	3.77, 0.13 *	3.42, 0.12 *	7.86, 0.24 **	0.92, 0.04	1.09, 0.04	1.88, 0.07 †

Note. Bolded *t*-scores are significantly greater than 65 at $p < .05$.

Cases with missing data were deleted casewise. Subscale *n*'s are the same for all CBCL scales: Selective $n = 5$, Co-Primary $n = 19$, Appetite $n = 10$, Fear $n = 46$.

Means in same column with different subscripts are significantly different at $p < .05$.

† $p < .08$.

* $p < .05$.

** $p < .001$.