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Medical comorbidities, nutritional markers, and cardiovascular risk markers in youth with ARFID

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Abstract

Objective: Avoidant/restrictive food intake disorder (ARFID) is common among populations with nutrition-related medical conditions. Less is known about medical comorbidity/complication frequencies in youth with ARFID. We evaluated medical comorbidities and metabolic/nutritional markers among female and male youth with full/subthreshold ARFID across the weight spectrum compared to healthy controls (HC).

Method: In youth with full/subthreshold ARFID (n=100; 49% female) and HC (n=58; 78% female), we assessed self-reported medical comorbidities via clinician interview and explored abnormalities in metabolic (lipid panel, high-sensitive C-reactive protein (hsCRP)) and nutritional (25(OH) vitamin D, vitamin B12, folate) markers.

Results: Youth with ARFID, compared to HC, were over ten times as like to have self-reported gastrointestinal conditions (37% vs 3%; OR=21.2; 95%CI=6.2–112.1) and over two times as

likely to have self-reported immune-mediated conditions (42% vs 24%; OR=2.3; 95%CI=1.1–4.9). ARFID, compared to HC, had a four to five times higher frequency of elevated triglycerides (28% vs 12%; OR=4.0; 95% CI=1.7–10.5) and hsCRP (17% vs 4%; OR=5.0; 95%CI=1.4–27.0) levels.

Discussion: Self-reported gastrointestinal and certain immune comorbidities were common in ARFID, suggestive of possible bidirectional risk/maintenance factors. Elevated cardiovascular risk markers in ARFID may be a consequence of limited dietary variety marked by high carbohydrate and sugar intake.

Keywords

Avoidant/restrictive food intake disorder; feeding and eating disorders; gastrointestinal disease; nutritional insufficiency; food allergies; metabolic diseases; allergy and immunology; high-sensitive C-reactive protein; lipid panel; triglycerides

INTRODUCTION

Avoidant/restrictive food intake disorder (ARFID) is characterized by persistent food restriction (i.e., food volume and/or variety) leading to nutrient insufficiencies, low weight, failure to gain weight/grow, dependence on nutritional supplements/tube feeding, and/or significant psychosocial impairments (APA, 2021). Recent research shows a high frequency of ARFID symptoms among individuals with medical conditions such as gastrointestinal (GI) disorders (Bennett et al., 2022; Burton Murray et al., 2020; Burton Murray et al., 2021; Burton Murray, Rao, et al., 2022; Burton Murray, Riddle, et al., 2022; Fink et al., 2021; Ketchem & Dellon, 2022; Yelencich et al., 2021) and food allergies (Ciciulla et al., 2023; Patrawala et al., 2022). There may be bi-directional risks, with medical conditions putting some individuals at risk for developing ARFID, and ARFID putting some individuals at risk for developing medical comorbidities. However, data on the frequency of medical conditions in ARFID populations remain limited.

Recent research shows particularly high frequency of ARFID among individuals with GI and certain immune-mediated conditions. ARFID symptoms have been reported in approximately 25% of children/adolescents (Burton Murray, Rao, et al., 2022) and adults (Burton Murray et al., 2020; Burton Murray et al., 2021; Burton Murray, Riddle, et al., 2022) with disorders of gut-brain interaction. In addition, ARFID symptoms have been reported in 11–53% of adults with inflammatory bowel disease (Fink et al., 2021; Yelencich et al., 2021), 49–57% of adults with celiac disease (Bennett et al., 2022; Fink et al., 2021), 43–51% of adults (Fink et al., 2021) and children (Ketchem & Dellon, 2022) with eosinophilic esophagitis, and 53% of adults (Ciciulla et al., 2023) and 37% of children (Patrawala et al., 2022) with Immunoglobulin E (IgE)-mediated food allergies.

Research on GI/immune conditions in ARFID samples is more limited, but GI symptoms have frequently been reported by children/adolescents and adults with ARFID in previous studies (in 70–100%; Cooney et al. 2018; Cooper et al. 2021; Nakai et al. 2016). Adults with ARFID had significantly more GI symptoms and testing than those with anorexia nervosa (Cooper et al., 2021). Low-weight females with ARFID had significantly more frequent GI symptoms, asthma, food allergies, and drug allergies than females with anorexia

nervosa (Aulinas et al., 2020). However, ARFID occurs across the full weight spectrum—medical comorbidity data in ARFID among individuals at higher weights have yet to be reported. Bi-directional estimates of ARFID and medical comorbidities could inform future longitudinal research on ARFID developing because of a medical condition or vice versa.

The limited diet characteristic of ARFID may put some individuals at risk for developing medical complications due to nutrition deficiencies. In dietary recall studies, children/adolescents with ARFID report a higher intake of carbohydrates and added sugars, and lower vegetable and protein intake compared to healthy controls (HC) (Harshman et al., 2019). Further, case reports/series of individuals with ARFID have shown Vitamin B12 and folate deficiencies leading to neurological complications (Yule et al., 2021) and a case-control study showed vitamin D deficiency complicated by rickets (Kells et al., 2023). Decreased bone density and/or higher risk of fractures have been reported in youth and adults with ARFID (Alberts et al., 2020; Nitsch et al., 2023; Schorr et al., 2019; Sella et al., 2023). While a selective diet and reduced dietary quality have been associated with obesity and related comorbidities (Castro-Barquero et al., 2020; Mozaffarian, 2016; Sarin et al., 2019), the frequency of metabolic complications in ARFID are unknown.

We conducted an exploratory cross-sectional study comparing a sample of male and female children/adolescents with full or subthreshold ARFID to HC. Our primary aim was to compare the frequency and characteristics of medical comorbidities between groups. Based on the high frequency of ARFID among individuals with GI/immune-mediated conditions, we expected GI and immune-mediated disorders to be more common in youth with ARFID than HC. We also explored metabolic and nutritional markers, expecting a higher frequency of abnormalities in youth with ARFID compared with HC.

METHOD

Design

Participants were drawn from two National Institutes of Health-funded studies evaluating the neurobiology of restrictive eating disorders (R01MH103402, 04/2014–03/2020; R01MH108595, 03/2016–02/2021).

For participants <18 years old, a parent/guardian signed written consent and the participant completed assent. Participants ≥18 years signed written consent. All study procedures were approved by the Mass General Brigham Institutional Review Board.

Participants

We included 100 participants with full (n=88) and subthreshold ARFID (n=12), and 58 HC aged 10–23 years (see Supplemental Figure 1). A subset (n=20) of females with low-weight (i.e., <90% of median body mass index for age) in our ARFID group were previously included in a paper reporting some medical comorbidities (Aulinas et al., 2020); the paper did not include males or individuals with ARFID across the weight spectrum, as included in the current study. For the current study, we also performed additional blood tests for metabolic markers and vitamin levels. Inclusion and exclusion criteria are listed in Supplemental Content.

Procedures

Screening and baseline visits included detailed questionnaires of demographic characteristics and medical history conducted by a clinician. Race and ethnicity were self-reported and presented as separate variables. Visits also included physical examination with anthropometric measurements of height, weight, waist-to-hip ratio, and Tanner staging.

We used available fasting blood samples for metabolic markers: lipid profile (total cholesterol, High-Density Lipoprotein (HDL) cholesterol, Non-HDL cholesterol, Low-Density Lipoprotein (LDL) cholesterol, triglycerides), high-sensitive C-Reactive Protein (hsCRP) as a marker of cardiovascular risk, and nutritional markers: 25(OH) vitamin D, vitamin B12 and folate levels. All samples were analyzed at Quest Diagnostics using standard techniques (see Supplemental Methods).

Statistical Analysis

We used *R* Studio (Team, 2014) for analyses. For descriptive purposes, we compared participant characteristics between groups using independent sample t-tests or Kruskal-Wallis H tests for continuous variables and chi-square tests or Fisher's exact tests for categorical variables.

For our primary aim, we reported medical comorbidity frequencies between groups using chi-square tests. We used two logistic regressions to compare GI and immune-mediated comorbidities respectively between groups adjusting for age, sex, and BMI percentile as descriptive analyses showed differences in these variables between groups (see Table 1). For our exploratory aim, we compared metabolic and nutritional markers between groups using independent t-tests or Kruskal-Wallis H tests (for continuous values of each marker) and chi-square tests or Fisher's exact tests (for presence/absence of an abnormality in the marker); if chi-square/Fisher's tests were significantly different, we ran a logistic regression adjusting for age, sex, and BMI percentile. Given our small sample size and cell counts for comorbidities, for all logistic regressions we used Firth's bias-reduced logistic regression using the logitsf package in R, which includes penalized maximum likelihood parameters (Heinze et al., 2023). For all univariate analyses, we calculated effect sizes as follows: *r* for all continuous variables and Cohen's ω for all categorical variables (0.1=small, 0.3=medium, 0.5=large).

RESULTS

Participant Characteristics

Table 1 summarizes participant characteristics. Participants with ARFID were slightly younger than HC (15.9 ±3.9 years vs. 17.6 ±3.6 years; p=.0051; small-medium difference), had a greater proportion of males (51% vs. 22%; p=.008; small-medium difference), and had lower BMI percentiles (33.5±32.1 vs. 53.3±20.2; p=.00015; medium difference). More participants with ARFID were pre-menarcheal (29% vs. 7%; p=.013; small-medium difference), and for those who had reached menarche, there was a younger age of menarche (12.1±1.4 vs. 12.8±1.0 years; p=.027; small-medium difference). The use of GI medications

(p=.001; small-medium difference) and vitamins and supplements (p=.00002; medium difference) was higher in the ARFID group compared to HC.

Medical Comorbidities

Frequencies of specific medical comorbidities and univariate comparisons between groups are presented in Supplemental Table 1 and Figure 1. As hypothesized, participants with ARFID were more than ten times more likely to have GI conditions compared with HC while adjusting for age, sex, and BMI percentile (37% vs. 3%; OR=21.2; 95%CI=6.2–112.1; SE=2.0 p<.0001). Also consistent with our hypotheses, participants with ARFID were more than two times as likely to have immune-mediated conditions compared with HC while adjusting for age, sex, and BMI percentile (42% vs 24%; OR=2.3; 95%CI=1.1–4.9; SE=1.5; p=.037). The most frequent GI conditions in ARFID were constipation (19%) and acid reflux (16%), both of which were more common than in HCs with small-medium effects on univariate comparison. The most frequent immune-mediated conditions in ARFID were drug allergies (22%), food allergies (20%), and asthma (16%), all of which had either a small or less effect when compared to the frequencies in HCs (≤.1).

Metabolic/Nutritional Markers

Metabolic and nutritional markers with univariate comparisons are presented in Supplemental Table 1 and Figure 1. Consistent with our hypothesis that those with ARFID would have a higher frequency of metabolic marker abnormalities, while adjusting for age, sex, and BMI percentile, participants with ARFID were more than twice as likely as HC to have hypertriglyceridemia (28% vs 12%; OR=4.0; SE=1.6; 95% CI=1.7–10.5; p=.001), and four times as likely to exhibit elevated hsCRP levels (17% vs. 4%; OR=5.0; SE=2.0; 95%CI=1.4–27.0; p=.012). For all other markers on univariate comparison, there were small or less differences (≤.1) between ARFID and HC. Of note, in the ARFID group, only 25% of participants with hypertriglyceridemia and 67% of those with high hsCRP also had obesity/overweight; 25% of participants with hypertriglyceridemia were low weight.

DISCUSSION

In this first report of medical comorbidities in male and female youth with ARFID across the weight spectrum (ranging from underweight to obesity), we found that more than one-third of youth with full/subthreshold ARFID had GI (37%) and immune (42%) comorbidities, respectively more than ten and two times as common than in HC. Despite a lower BMI percentile in the ARFID group, hypertriglyceridemia was twice as common and elevated hsCRP levels more than four times as common in ARFID than in HC, possibly reflecting limited dietary variety marked by high carbohydrate and sugar intake. Future research is needed with larger samples, as some of our estimates had lower precision (wide confidence intervals for some findings) and we were limited by reliance on participant self-report of medical conditions.

Our frequency of GI and immune comorbidities in ARFID are similar to the frequency of ARFID symptoms reported in approximately one-third to half of pediatric and adult GI (Atkins et al., 2023; Burton Murray et al., 2020; Burton Murray et al., 2021; Burton

Murray, Rao, et al., 2022; Burton Murray, Riddle, et al., 2022; Drossman & Hasler, 2016) and certain immune condition samples (Bennett et al., 2022; Ciciulla et al., 2023; Fink et al., 2021; Ketchem & Dellon, 2022; Patrawala et al., 2022; Yelencich et al., 2021). A subset of individuals with ARFID may be at risk for developing GI or immune conditions and/or a subset of individuals with GI or immune conditions may be at risk for developing ARFID, but longitudinal research is needed. For the latter pathway, individuals with certain GI and immune conditions often require exclusion diets. We and others have proposed that increased susceptibility to fear conditioning may put some individuals at risk for developing maladaptive food avoidance/restriction in the setting of exclusion diets, for both GI (Burton Murray et al., 2020; Burton Murray & Staller, 2021) and some immune conditions (Abber & Burton Murray, 2023; Coburn et al., 2022). In fact, a retrospective study showed that a history of trying at least one exclusion diet was associated with a three times greater frequency of ARFID symptoms at neurogastroenterology intake (Atkins et al., 2023). Our medical condition history data should be interpreted with caution, as medical conditions were self-reported by participants to a study clinician, and not objectively verified. Further, our study's generalizability is limited, given that our sample did not include youth <10 years old, female predominance in the HC sample, and limited racial and ethnic diversity (a majority of participants identified as White).

Other than vitamin D (Kells et al., 2023), vitamin levels and nutritional markers in ARFID have only been reported in small cases series. No studies have reported on the metabolic consequences of the limited diet characteristic of ARFID. We demonstrated youth with ARFID were respectively twice and four times as likely to have elevated triglycerides and hsCRP (two cardiovascular risk markers) compared to HC. Abnormal metabolic functioning may be a consequence of limited dietary variety in ARFID—a major strength of our study is that we evaluated metabolic abnormalities across the full weight spectrum. Strikingly, 28% of our ARFID sample had hypertriglyceridemia and 17% elevated hsCRP, while only 16% had overweight or obesity, further supporting the possible relationship between ARFID and metabolic abnormalities regardless of weight. Future research should test if differences exist with a larger sample, including control participants at higher and lower weight status. Metabolic screening in individuals with ARFID may be warranted regardless of weight, the clinical implications of which are not yet known.

Nutritional marker averages and deficiency frequencies had small or less differences between groups; this may be because almost half of our ARFID sample were taking a multi-vitamin/mineral. We were also limited by the types of nutritional markers that could be analyzed, based on available blood samples from the parent study. Severe complications due to compromised nutrition have been described in prior case reports/series in ARFID (e.g., spinal cord subacute degeneration, visual loss due to B12 deficiencies, Chandran et al. 2015; Chiarello et al. 2018; retinopathy due to vitamin A deficiency, Mahoney et al. 2022). Longitudinal research is needed to evaluate cardiometabolic risk, and broader nutritional markers in ARFID.

In this exploratory investigation, we that of GI/immune conditions were relatively common (more than one-third) in youth with ARFID, and we are the first report of higher frequency

of hypertriglyceridemia and elevated hsCRP levels in youth with ARFID compared to HC. Findings emphasize possible risk for medical complications in ARFID.

Supplementary Material

Refer to Web version on PubMed Central for supplementary material.

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Data availability statement:

The data that support the findings of this study are available upon reasonable request.

Abbreviations

ARFID	Avoidant/restrictive food intake disorder
BMI	Body Mass Index
EDA-5	Eating Disorder Assessment for DSM-5
EDE	Eating Disorder Examination
GI	Gastrointestinal
HC	Healthy Controls
HDL	High-Density Lipoprotein
hsCRP	High-sensitive C-Reactive Protein
IgE	Immunoglobulin E
KSADS-PL	Kiddie Schedule for Affective Disorder and Schizophrenia – Present and Lifetime
LDL	Low-Density Lipoprotein
PARDI	Pica, ARFID, and Rumination Disorder Interview

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Public significance statement:

Youth with avoidant/restrictive food intake disorder often consume limited diets, enriched with carbohydrates and added sugars and limited vegetable and protein, potentially leading to nutritional deficiencies and medical complications. Compared to healthy youth, those with ARFID had a higher frequency of self-reported gastrointestinal and immune-mediated conditions, as well as a higher frequency of elevated cardiovascular risk markers. These findings may serve to inform the clinical management of youth with ARFID.

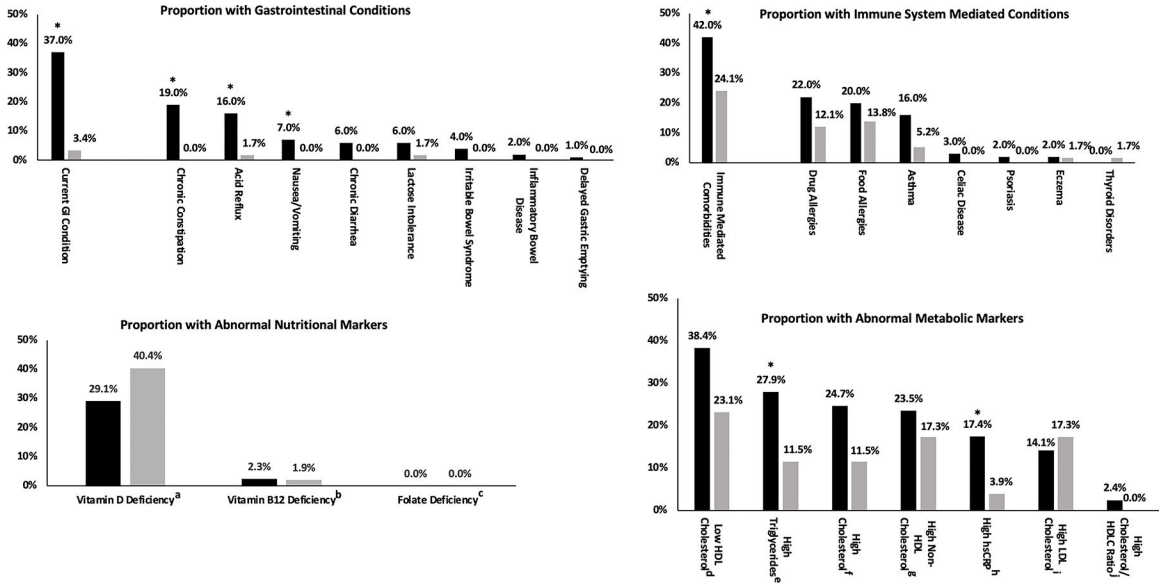

Figure 1.

Comparison of Medical Comorbidities and Metabolic/Nutritional Markers between ARFID (n=100; black bars) and HC (n=58; gray bars).

Note. Univariate comparisons (see Supplemental Table 1 for specific values); multivariate analysis is reported in the text. A subset of participants had blood samples that were run to evaluate nutritional and metabolic abnormalities (n=86 ARFID and n=52 HC). GI=gastrointestinal; ARFID=avoidant/restrictive food intake disorder; HC=healthy control; HDL=High-Density Lipoprotein; LDL=Low-Density Lipoprotein (LDL); hsCRP=high-sensitive C-Reactive Protein.

*p<.05

[a]25(OH) vitamin D deficiency values were as follows based on age— < 30 ng/mL for ages 20 years and older; < 20 ng/mL for ages 19 years and under.

[b]Vitamin B12 deficiency values were based on a cutoff of < 200 pg/mL for all ages.

[c]Folate deficiency values were based on a cutoff of ≤ 5.4 ng/mL for all ages.

[d]Low HDL cholesterol values were as follows based on age— < 50 mg/dL for ages 20 years and older; ≤ 45 mg/dL for ages 19 years and under.

[e]High triglyceride values were as follows based on age— ≥ 150 mg/dL for ages 20 years and older; ≥ 90 mg/dL for ages 19 years and under.

[f]Missing data for n=1 ARFID. High total cholesterol values were as follows based on age— ≥ 200 mg/dL for ages 20 years and older; ≥ 170 mg/dL for ages 19 years and under.

[g]Missing data for n=1 ARFID. High non-HDL cholesterol values were as follows based on age— ≥ 130 mg/dL for ages 20 years and older; ≥ 120 mg/dL for ages 19 years and under.

[h]Missing data for n=1 HC. High hsCRP values were based on a cutoff of ≥ 2.0 mg/L for all ages.

[i]Missing data for n=1 ARFID. High LDL cholesterol values were as follows based on age— ≥ 100 mg/dL for ages 20 years and older; ≥ 110 mg/dL for ages 19 years and under.

[j]Missing data for n=1 ARFID. High cholesterol/HDLC ratio values were based on a cutoff of ≥ 5.0 for all ages.

Table 1:

Participant characteristics.

	Full/Subthreshold ARFID (*n*=100)	HC (*n*=58)	t, H or Chi	p-value	*r* or ω
Participant characteristics					
Age (years), *M*(SD)	15.9 (3.9)	17.6 (3.6)	7.90[h]	.0050	.224
Sex, n (%)			11.29	.0008	
Female	49 (49.0%)	45 (77.6%)			--
Male	51 (51.0%)	13 (22.4%)			--
Race, n (%) [a]					
American Indian/Alaska Native	0	0			--
Asian	1 (1.0%)	8 (14.3%)	0.06[g]	.001	.236
Black or African American	2 (2.0%)	1 (1.8%)	1.12[g]	1.0	0
More than One Race	6 (6.0%)	2 (3.6%)	1.72[g]	.712	.029
Native Hawaiian or Other Pacific Islander	0	0	--	--	--
White	91 (91.0%)	45 (80.4%)	2.75	.097	.131
Ethnicity, n (%) [a]			0.018	.893	
Hispanic/Latino	11 (11.0%)	5 (8.9%)			--
Non-Hispanic/Latino	89 (89.0%)	51 (91.1%)			--
BMI, *M* (SD)	24.3 (7.9)	22.4 (1.7)	0.07[h]	.799	.041
Percentile, M (SD)	33.5 (32.1)	53.3 (20.2)	14.36[h]	.0002	.347
BMI Categories for <20 years old (percentiles),[b] n (%)					
Low weight (<5th)	16 (20.3%)	0	7.70	.006	.247
Normal weight (5th to <85th)	54 (68.4%)	40 (100.0%)	14.18	.0002	.336
Overweight (85th<95th)	4 (5.1%)	0	--[g]	.299	.082
Obesity (≥95th)	5 (6.3%)	0	--[g]	.167	.109
BMI Categories for ≥20 years old (kg/m^2), n (%)					

	Full/Subthreshold ARFID (*n*=100)	HC (*n*=58)	t, H or Chi	p-value	*r* or ω
Low weight (<18.5 kg/m^2)	6 (28.6%)	0	--[g]	.022	.179
Normal weight (18.5–24.9 kg/m^2)	8 (38.1%)	16 (88.9%)	8.53	.003	.424
Overweight (25.0–29.9 kg/m^2)	2 (9.5%)	2 (11.1%)	0.85[g]	1.0	0
Obesity (≥ 30.0 kg/m^2)	5 (23.8%)	0	--[g]	.050	.154
Clinical Characteristics					
Premenarcheal,[c]n (%)	14 (28.6%)	3 (6.7%)	6.19	.013	.194
Age of menarche (years), *M (SD)*	12.1 (1.4)	12.8 (1.0)	-2.27	.027	.263
Tanner Stages					
Breast/Male Genitalia [d]					
1	15 (16.0%)	4 (7.0%)	1.83	.176	.109
2	19 (20.2%)	2 (3.5%)	6.93	.008	.210
3	10 (10.6%)	4 (7.0%)	0.15	.698	.032
4	14 (14.9%)	9 (15.8%)	0	.996	0
5	36 (38.3%)	38 (66.7%)	11.96	.0005	.271
Pubic hair [e]					
1	18 (19.8%)	4 (7.0%)	3.56	.059	.153
2	17 (18.7%)	5 (8.8%)	1.99	.158	.115
3	8 (8.8%)	6 (10.5%)	0.004	.950	.005
4	15 (16.5%)	6 (10.5%)	0.59	.442	.063
5	33 (36.3%)	36 (63.2%)	9.13	.003	.241
Blood Pressure (mm Hg)					
Systolic	107.9 (11.0)	106.9 (10.0)	0.55	.583	.043
Diastolic	63.3 (8.6)	65.4 (7.0)	4.76[h]	.029	.174
Waist-to-Hip Ratio M(SD)	0.84 (0.1)	0.84 (0.1)	0.13[h]	.716	.029
ARFID Presentation[f] *(n = 96)*					
Sensory Sensitivity	76 (79.2%)	N/A	--	--	--
Sensory Sensitivity + Lack of Appetite	51 (53.1%)	N/A	--	--	--
Sensory Sensitivity + Fear of Adverse Consequences	18 (18.8%)	N/A	--	--	--
Lack of Appetite	64 (66.7%)	N/A	--	--	--
Lack of Appetite + Fear of Adverse Consequences	20 (20.8%)	N/A	--	--	--

	Full/Subthreshold ARFID (*n*=100)	HC (*n*=58)	t, H or Chi	p-value	*r* or ω
Fear of Adverse Consequences	24 (25.0%)	N/A	--	--	--
All three presentations	15 (15.6%)	N/A	--	--	--
MEDICATIONS, n (%)					
Antidepressants/anxiolytics	39 (39.0%)	0	27.97	<.0001	.388
Endocrine-related/hormone therapies	7 (7.0%)	6 (10.3%)	0.65[g]	.551	.047
Gastrointestinal-related	22 (22.0%)	1 (1.7%)	10.56	.0012	.250
Immunomodulator/biologic	2 (2.0%)	0	--[g]	.532	.050
Pulmonary/allergy-related	21 (21.0%)	6 (10.3%)	2.24	.135	.118
Psychostimulants	17 (17.0%)	0	9.35	.002	.236
Other antipsychotics, anesthetics, anticonvulsants	8 (8.0%)	0	--[g]	.027	.173
Other medications[j]	8 (8.0%)	3 (5.2%)	1.59[g]	.747	.026
VITAMINS/SUPPLEMENTS, n (%)	62 (62.0%)	16 (27.6%)	16.04	.00006	.304
Multi-vitamin/multi-mineral	47 (47.0%)	8 (13.8%)	16.40	.00005	.307
Vitamin D	15 (15.0%)	3 (5.2%)	2.61	.107	.127
Vitamin B12	4 (4.0%)	0	--[g]	.297	.083
Iron	7 (7.0%)	1 (1.7%)	4.26[g]	.260	.089
Omega-3/fish oil	9 (9.0%)	1 (1.7%)	5.59[g]	.094	.132
Calcium	6 (6.0%)	0	--[g]	.086	.135
Zinc	4 (4.0%)	0	--[g]	.297	.083
Phosphorus	2 (2.0%)	0	--[g]	.532	.050
Formula	16 (16.0%)	0	8.64	.003	.228
Probiotic	5 (5.0%)	1 (1.7%)	2.98[g]	.416	.065
Other supplements[k]	9 (9.0%)	2 (3.4%)	2.75[g]	.331	.077

Note. ARFID=avoidant/restrictive food intake disorder; HC=healthy control; BMI=body mass index. *r* effect size used for all independent t-tests and Cohen's ω effect size used for all chi-square tests.

[a]Data missing for n=2 HC because participants preferred not to answer.

[b]BMI percentile categories based on the Center for Disease Control guidelines. HC participants were included in this study if they were in the 15th-85th percentile range.

[c] Menstruating females only.

[d] Data missing for n=6 ARFID and n=1 HC because participants did not want to complete evaluation.

[e] Data missing for n=9 ARFID and n=1 HC because participants did not want to complete evaluation.

[f] PARDI severity groups were defined by the following subscale cut-offs: Sensory Sensitivity ≥1.125, Lack of Appetite ≥ 0.625, and Fear of Adverse Consequences ≥ 0.5.

[g] Fisher's exact test conducted when expected counts were <5. Cohen's ω used for corresponding effect sizes.

[h] Kruskal-Wallis H test due to non-normal distribution of continuous variable. r used for corresponding effect sizes.

[i] Includes n=1 antibiotic, n=9 melatonin, n=1 isotretinoin.

[j] Includes n=1 protein shake, n=1 N-acetyl cysteine, n=1 magnesium, n=2 biotin, n=1 lactase, n=1 ginkgo biloba, n=2 fiber, n=2 fluoride, n=2 CBD oil, n=1 aloe juice, n=1 Nutricap.