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Distribution and clinical comparison of restrictive feeding and eating disorders using ICD-10 and ICD-11 criteria

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Abstract

Objective: Within the eleventh edition of the International Classification of Diseases (ICD-11), diagnostic criteria for feeding and eating disorders were revised and new diagnoses including avoidant/restrictive food intake disorder (ARFID) are classifiable; however, nothing is known about how these changes affect the prevalence of feeding and eating disorders. This study compared the distribution and clinical characteristics of restrictive feeding and eating disorders between ICD-10 and ICD-11.

Method: The Eating Disorder Examination (EDE), its child version, and the EDE ARFID module were administered to $N = 82$ patients (0–17 years) seeking treatment for restrictive feeding and eating disorders and their parents. Clinical characteristics were derived from medical records, questionnaires, and objective anthropometrics.

Results: The number of residual restrictive eating disorders (rrED) significantly decreased from ICD-10 to ICD-11 due to a crossover to full-threshold disorders, especially anorexia nervosa (AN) or ARFID. Patients reclassified to ICD-11 ARFID were younger, had an earlier age of illness onset, more restrictive eating behaviors, and tended to have more somatic comorbidities compared to those reclassified to ICD-11 AN. Patients with rrED according to both ICD-10 and ICD-11 were younger, had an earlier age of illness onset, less shape concern, and more somatic comorbidities than patients who were reclassified from ICD-10 rrED to ICD-11 AN or ARFID.

Discussion: This study highlights the inclusive approach of ICD-11 criteria, paving the way for more targeted treatment, and ARFID's high clinical relevance. Future studies considering nonrestrictive feeding and eating disorders across the life span may allow further analyses on diagnostic crossover.

Public Significance: Changes in diagnostic criteria for restrictive eating disorders within the newly published ICD-11 led to an increase in full-threshold disorders, while the number of rrED was significantly lowered compared to ICD-10 criteria. The results thus highlight the diagnostic utility of ICD-11 criteria and may help providing adequate treatment to children and adolescents with rrED.

KEYWORDS
anorexia nervosa, avoidant/restrictive food intake disorder, classification, comparisons, diagnostic crossover, distribution, ICD-10, ICD-11, residual restrictive eating disorders, restrictive eating disorders

1 | INTRODUCTION

The updated, eleventh edition of the International Classification of Diseases (ICD-11) is the current revision of the most widely used mental and behavioral disorders classification system in the world (Reed et al., 2011; WHO, 2022). Besides the overall effort to improve the diagnoses' clinical utility (Reed et al., 2019), revisions in the newly combined chapter of feeding and eating disorders were intended to reduce residual (atypical, other specified or unspecified) categories (Stein et al., 2020). For example, there is a broadening of diagnostic criteria of anorexia nervosa (AN), consistent with the fifth edition of the Diagnostic and Statistical Manual of Mental Disorders (DSM-5; APA, 2013). ICD-11 criteria provide more detailed guidance on the weight criterion as central feature of AN than the DSM-5 and therefore include patients presenting weight disturbance in various ways (WHO, 2022). The newly introduced avoidant/restrictive food intake disorder (ARFID) replaced and extended the ICD-10 category of feeding disorder (FD) of infancy and childhood (WHO, 2019), consistent with the ICD-11 and DSM-5 life span approach (Gradl-Dietsch et al., 2020; Hay, 2020). ARFID explicitly includes adolescent or adult individuals (Uher & Rutter, 2012) and children previously being excluded from FD, for example, due to higher weight resulting from oral nutritional supplementation or tube feeding (WHO, 2022; Williams et al., 2015).

Individuals with AN and ARFID are both characterized by a highly restrictive food intake, which can go along with significant weight loss or growth delay, or other physical or psychosocial impairment. Nevertheless, recent evidence indicated higher levels of food avoidance and restrictive eating behaviors, including food fussiness, emotional undereating, and satiety responsiveness, for patients with ARFID than for patients with AN (Schmidt et al., 2022). In comparison to AN, other reasons than concerns about weight and shape and weight-loss intentions drive food intake in ARFID, such as an apparent lack of interest in eating, sensory sensitivities toward food, or concerns about the aversive consequences of eating (APA, 2013). Previous studies revealed that patients with ARFID were younger, more likely to be male, and had an earlier age of illness onset than those with AN (e.g., Becker et al., 2019; Cañas et al., 2021; Zanna et al., 2021). Findings on body weight status are indecisive, showing similarly low (e.g., Nicely et al., 2014; Norris et al., 2014; Ornstein et al., 2017) or higher body weight status (e.g., Becker et al., 2019; Cañas et al., 2021; Zanna et al., 2021) for patients with ARFID versus AN. Antecedents in medical histories and pre-existing gastrointestinal symptoms were found to be more common in ARFID than individuals with other eating disorders (e.g., Cañas et al., 2021; Fisher et al., 2014; Lieberman et al., 2019). ARFID has a high comorbidity with other mental disorders in general (Bourne et al., 2020; Kambanis et al., 2020), with anxiety disorders, obsessive compulsive disorder (OCD), attention-deficit/hyperactivity disorder (ADHD), and pervasive developmental disorders (PDD) being more and affective disorders less prevalent than in individuals with AN (e.g., Cañas et al., 2021; Nicely et al., 2014).

Although there is no evidence on the effects of ICD's revisions on prevalence or diagnostic crossover of eating disorders, studies comparing DSM-IV and DSM-5 criteria (e.g., Caudle et al., 2015; Gualandi et al., 2016; Machado et al., 2013; Ornstein et al., 2013) highlight a remarkable reduction of residual eating disorders, with decreases between 9% and 30%, due to crossover to full-threshold disorders, while classifications into AN increased by between 2.5% and 25%. However, all previous comparative studies focused on adults or children ≥7 years, were mostly evaluated based on chart reviews or clinical judgments only, and solely evaluated DSM revisions, although diagnostic criteria for eating disorders slightly differ between ICD and DSM. In addition, because most previous classification studies only focused on the traditional eating disorders AN, bulimia nervosa, binge-eating disorder, and other specified feeding or eating disorders, virtually nothing is known about ARFID's diagnostic relevance. In a sample of $N = 215$ inpatients aged 8–21 years, the only study considering DSM-5 ARFID demonstrated diagnostic crossover from residual eating disorders or FD to 14% emerging ARFID (Ornstein et al., 2013).

In this context, the first aim of this study was to determine the distribution of restrictive eating disorders comparing ICD-10 and ICD-11 criteria in treatment-seeking children and adolescents aged 0–17 years in a German university hospital, hypothesizing that a significant number of ICD-10 residual restrictive eating disorders (rrED) will be reclassified to ICD-11 AN or ARFID, while all ICD-10 FD will be reclassified to ICD-11 ARFID. The second aim was to provide a deeper understanding about what makes a classification of rrED under ICD-10 more likely to be relabeled as AN or ARFID under ICD-11. We hypothesized that patients with an ICD-10 rrED differ depending on whether they are reclassified to ARFID or AN according to ICD-11 in terms of sociodemographic and clinical variables (in terms of being younger, more likely to be male, having a younger age of illness onset), medical characteristics (higher prevalence of somatic comorbidities and antecedents in patients' medical histories, higher prevalence of mental comorbidities in general and specifically for anxiety disorders, OCD, ADHD and PDD, but lower prevalence of affective disorders), eating disorder psychopathology (higher levels of restrictive eating behaviors, lower levels of shape concern), but equivalent levels of body weight status. Third, comparisons between patients who were reclassified from ICD-10 rrED to ICD-11 AN or ARFID versus those with rrED according to both ICD-10 and ICD-11 in sociodemographics, clinical variables, medical characteristics, and eating disorder psychopathology were made exploratively due to the lack of sufficient evidence.

2 | METHOD

2.1 | Participants

The sample was recruited at Leipzig University Medical Center between February 2018 and October 2021. For inclusion, patients were required to seek in- or outpatient treatment for a restrictive feeding or eating disorder, be between 0 and 17 years old, and to present with adequate German language skills. For analysis, complete data from medical reports and diagnostic interviews were required. Out of $n = 113$ eligible patients being referred to the research team by their therapists, $n = 12$ could not be reached, $n = 12$ refused participation, $n = 4$ did not meet criteria for an ICD-10/ICD-11 restrictive eating disorder, $n = 2$ did not present with adequate German language skills, and $n = 1$ did not complete the full diagnostic interview, leaving a sample of $N = 82$ patients (see Figure S1). Approval for this study was given by the Ethics Committee of the Medical Faculty of the University of Leipzig, Germany (Reg. No. 120/15-ek). Written informed assent and consent to participate were obtained by children ≥8 years and parents prior to study participation.

2.2 | Procedure

Patients were invited by their therapists to participate in the study using information flyers. If interested, appointments for diagnostic interviews were scheduled separately for children and parents and self-report questionnaires were sent to families. The German version of the Eating Disorder Examination (EDE; Fairburn et al., 2014; Hilbert & Tuschen-Caffier, 2016) or its child adapted version (ChEDE; Bryant-Waugh et al., 1996; Hilbert, 2016) and the child, adult, and parent version of the ARFID module for the EDE (Schmidt et al., 2019; Schmidt et al., 2022) were administered by trained research assistants. Because the COVID-19 pandemic precluded in-person diagnostic interviews, out of 130 interviews, $n = 30$ (23.0%) were completed via telephone, mostly ($n = 27$, 90.0%) with parents. All families were offered to be informed about the results of the diagnostic interviews and the opportunity to share the diagnostic information with their therapists. Families were offered financial compensation of 15 Euro.

2.3 | Measures

2.3.1 | Avoidant/restrictive food intake disorder and feeding disorder of infancy and childhood diagnoses

ARFID module for the Eating Disorder Examination. To elicit diagnoses of ARFID and FD, the ARFID module (Schmidt et al., 2019) for the ChEDE (Bryant-Waugh et al., 1996; Hilbert, 2016), EDE (Fairburn et al., 2014; Hilbert & Tuschen-Caffier, 2016) and P-EDE (Loeb, 2016) was used; a semistructured clinical interview with established reliability and validity (Schmidt et al., 2019; Schmidt et al., 2022). The child and adolescent version of the ARFID module was integrated at the end of the (Ch)EDE, while the parent version was used stand-alone. Although the ARFID module was originally designed according to DSM-5, it covers all required diagnostic criteria for ICD-11 ARFID. Exclusion criteria (ICD-11 criteria B and C) were rated dichotomously (present vs. absent). Similarly, the ARFID module provided all relevant information to make a diagnosis of FD (see Table S1). For the present study, all interviews were coded using a predefined diagnostic sheet of ICD-10 and ICD-11 criteria to evaluate the presence of FD and ARFID according to ICD criteria. ICD codings were made by two research assistants with intensive training in the EDE and ARFID module and regular supervision by RS (see Tables S1 and S2).

2.3.2 | Anorexia nervosa and residual restrictive eating disorder diagnoses

Eating Disorder Examination. For assessing AN and rrED diagnoses, the validated German version of the Eating Disorder Examination (EDE; Fairburn et al., 2014; Hilbert & Tuschen-Caffier, 2016) and its child adapted version (Bryant-Waugh et al., 1996; Hilbert, 2016) were used; semistructured clinical interviews with established reliability and validity (Berg et al., 2012; Hilbert et al., 2013). All interviews were based on DSM-5 criteria (APA, 2013) and additionally used to elicit ICD-10 and ICD-11 diagnoses of AN, atypical AN, and other rrED diagnoses based on a standardized diagnostic sheet applying ICD-10 and ICD-11 criteria (see Tables S3 and S4).

2.3.3 | Sociodemographics

Parental report was used to assess patients' and parents' age at interview and sex assigned at birth (male or female), parents' highest educational level (dichotomously, <12 or ≥12 school years), family status, and nationality.

2.3.4 | Medical characteristics

Mental and somatic comorbidities. For mental and somatic comorbidities, patients' medical records from the time of the diagnostic interviews were systematically reviewed for any comorbidity noted by clinicians according to ICD-10 criteria. Comorbidities without explicit association to ARFID or AN, such as acute upper respiratory infections, were not considered. Based on evidence on relevant symptoms and comorbidities for ARFID and AN (APA, 2013), disorders were then categorized into diagnostic groups according to ICD-10 codes (WHO, 2019) by two research assistants. For mental comorbidities, affective disorders (ICD-10 codes F30–F39), anxiety disorders (F40–F41), OCD (F42), PDD (F84), and ADHD (F90) were coded. For somatic comorbidities, gastrointestinal diseases (K00–K93, A0–A9,

R10–R19), metabolic disorders (E70–E90), and congenital anomalies (malformations, deformations, and chromosomal abnormalities; Q00–Q99) were coded.

Antecedents in medical histories. For antecedents in patients' medical histories, the need for an invasive procedure within the first 4 months after birth was considered to allow comparability across the different age ranges, as the youngest patient was 5 months old. Therefore, a systematic review of patients' medical reports was carried out by two research assistants, rating the presence or absence of invasive procedure dichotomously following a definition for invasive procedure by Cousins et al. (2019). In the present study, this included, for example, interventions such as the creation of an ileostomy or gastrostomy and the correction of congenital malformations like omphaloceles or esophageal atresia.

2.3.5 | Eating disorder psychopathology

Child Eating Behavior Questionnaire (CEBQ). Parents' perceptions of their children's eating behavior were assessed by the validated CEBQ (Wardle et al., 2001; German version, A. Hilbert—unpublished manuscript). The questionnaire contains 35 items rated on a 5-point Likert scale (1 = *never* to 5 = *always*) and yields eight subscale mean scores (1–5) representing either food approach behaviors (food responsiveness, enjoyment of food, emotional overeating, desire to drink) or food avoidance behaviors (satiety responsiveness, slowness in eating, food fussiness, emotional undereating). Higher subscale mean scores indicate higher levels of abnormal eating behavior in children. In the present study, only the subscales for food avoidance behaviors were used, with Cronbach's α ranging between .70 and .90.

Eating Disorders in Youth-Questionnaire (EDY-Q). The parent-report version of the EDY-Q (Hilbert & van Dyck, 2016) was used to assess restrictive eating disturbances, with 14 items covering ARFID symptoms (10 items), weight and shape concern as exclusion criterion (2 items), and pica and rumination disorder (2 items) being rated on a 7-point Likert scale (0 = *never* to 6 = *always*). In addition to the total mean score (0–6; α = .70), with higher scores indicating more restrictive eating disturbances, the item on "feeling fat" was used to depict shape concern.

2.3.6 | Clinical variables

Age of illness onset. Information on the age of illness onset was obtained from the ARFID module (Schmidt et al., 2019), referring to the first onset of any symptoms related to the patient's restrictive or avoidant eating behavior.

Anthropometrics. Body weight and height were measured objectively to calculate the body mass index (BMI, kg/m^2) and BMI-standard deviation scores (BMI-SDS) based on age- and sex-specific German reference values (Kromeyer-Hauschild et al., 2001). BMI-SDS describe an individual's deviation from the population norm and are based on Cole's (1990) LMS method, with values of 0 corresponding to a BMI percentile of 50 and 1 and 2 standard deviations corresponding to the 16th/84th and 97.7th/2.3th BMI percentile. As recommended (Kromeyer-Hauschild et al., 2001), BMI-SDS ≤ −1.88 classify severe underweight (corresponding to BMI percentile 3), −1.88 < BMI-SDS ≤ −1.28 underweight (corresponding to BMI percentile 10), and −1.28 < BMI-SDS < 1.28 indicate normal weight.

Giessen Physical Complaint List for Children and Adolescents (GBB-KJ). To evaluate parents' perception of their children's somatic discomfort, a 10-item version of the German GBB-KJ (Barkmann & Brähler, 2009) with established psychometric qualities (Barkmann et al., 2008) was used. The presence of different key pediatric somatic symptoms (e.g., insomnia, weakness) was captured on a 5-point Likert scale (0 = *never* to 4 = *always*), with higher sum scores (0–40) showing higher levels of somatic discomfort (α = .84).

2.4 | Data analytic plan

In order to evaluate significant changes in the distribution of restrictive eating disorders according to ICD-10 and ICD-11, the McNemar-Bowker test was used, considering ICD-10 and ICD-11 FD, ARFID, AN, and rrED. In case of significant main effects, post-hoc McNemar tests were applied.

In order to reveal differences between patients reclassified to ICD-11 ARFID versus those reclassified to ICD-11 AN in sociodemographics (age at interview, sex), clinical variables (age of illness onset, GBB-KJ sum score), medical characteristics (antecedents in medical histories, mental and somatic comorbidities), and eating disorder psychopathology (EDY-Q mean score, EDY-Q Feeling fat, CEBQ Food avoidance scales), univariate analyses of variance (for continuous variables) or χ^2 analyses (for categorical variables) were performed. Due to assumed equivalence in BMI-SDS for patients reclassified to ICD-11 ARFID versus those reclassified to ICD-11 AN, the two one-sided tests (TOST) procedure for two-sample Welch's *t* tests was performed, examining whether the hypothesis that there are group differences extreme enough to be considered meaningful can be rejected. Statistical equivalence means that the difference between groups is smaller than what is considered meaningful and statistically falls within the interval indicated by equivalence bounds of $d = 0.50$ (Lakens et al., 2018). For an explorative comparison of patients who were reclassified from ICD-10 rrED to ICD-11 AN or ARFID versus those with rrED according to both ICD-10 and ICD-11, univariate analyses of variance (for continuous variables) or χ^2 analyses (for categorical variables) were performed on all variables mentioned above.

In case of non-normal distributions or nonhomogenic variance, Mann–Whitney *U* tests were conducted. Assuming significant associations of the compared diagnostic groups with age at interview and sex, analyses were additionally controlled for by these variables, but only reported when deviating from uncontrolled analyses.

A priori power analyses were calculated to determine the minimum sample size for detecting medium-to-large-sized effects (OR = 4; Chen et al., 2010) for diagnostic crossover from ICD-10 to ICD-11 with a statistical power of 0.80, resulting in $n = 67$ patients

being required for McNemar tests. Effect sizes were estimated with Cohen's *d* (for univariate analyses of variance, TOST, and Mann–Whitney *U* tests) and Cramér's *V* (for χ^2 analyses), which can be interpreted as small (0.2 or .1), medium (0.5 or .3), or large (0.8 or .5). For all statistical analyses IBM® SPSS Statistics® version 27.0 and jamovi version 2.2 (The jamovi project, 2021) were used with a two-tailed $\alpha < .05$ and an adjusted $\alpha < .010$ or $\alpha < .017$ for analyses on specific mental or somatic comorbidities and post-hoc McNemar tests taking multiple comparisons into account.

3 | RESULTS

3.1 | Sample description

In total, $N = 82$ patients aged 0–17 years were included, with 69.5% ($n = 57$) seeking inpatient and 30.5% ($n = 25$) seeking outpatient treatment. Mean age at interview was 9.6 years ($SD = 6.1$) and 64.6% ($n = 53$) were female. The sample had a mean BMI-SDS of −1.5 ($SD = 1.2$) with 42.7% ($n = 35$) having normal weight, 37.8% ($n = 31$) severe underweight, and 19.5% ($n = 16$) underweight (see Table 1). Out of 40 patients with ICD-11 ARFID, 60.0% ($n = 24$) presented with sensory sensitivities toward food, 50.0% ($n = 20$) presented with an apparent lack of interest in eating, and 35.0% ($n = 14$) had concerns about the aversive consequences of eating (presentations were allowed to co-occur).

TABLE 1 Sociodemographic and anthropometric characteristics of the sample.

	Total sample ($N = 82$)
Child sociodemographics	
Age at interview, years (*M*, *SD*)	9.6 (6.1)
Sex, female (*n*, %)	53 (64.6)
Nationality, German[a] (*n*, %)[b]	73 (98.6)
Child anthropometrics (objective)	
BMI-SDS (*M*, *SD*)	−1.5 (1.2)
Child weight status (*n*, %)	
Severe underweight (BMI-SDS ≤ −1.88)	31 (37.8)
Underweight (−1.88 < BMI-SDS ≤ −1.28)	16 (19.5)
Normal weight (−1.28 < BMI-SDS < 1.28)	35 (42.7)
Child treatment-seeking status (*n*, %)	
Inpatient treatment	57 (69.5)
Outpatient treatment	25 (30.5)
Parent sociodemographics	
Age at interview, years (*M*, *SD*)	41.2 (9.6)
Sex, female (*n*, %)	69 (84.1)
Education (*n*, %)[b]	
High (≥12 school years)	34 (47.2)
Family status (*n*, %)[b]	
Single	23 (31.9)
Married	36 (50.0)
Separated	12 (16.7)
Widowed	1 (1.4)
Body mass index (kg/m^2, subjective, *M*, *SD*)	25.2 (6.1)

Abbreviations: BMI, body mass index (kg/m^2); SDS, standard deviation score.
[a]Due to the low number of patients with nationality other than German, other nationalities are not reported separately in order to avoid a potential identification of patients.
[b]Due to missing data, values may not sum up to $N = 82$ (100%).

3.2 | Distribution of restrictive eating disorders in ICD-10 and ICD-11

As depicted in Table 2, rrED (atypical AN, other specified or unspecified restrictive eating disorders) showed a significant reduction from 50.0% ($n = 41$) based on ICD-10 criteria to 20.7% ($n = 17$; $p < .001$) according to ICD-11 due to crossover to ICD-11 full-threshold disorders (AN or ARFID). Classifications into AN increased from 24.3% ($n = 20$) according to ICD-10% to 30.5% ($n = 25$; $p > .05$) according to ICD-11, and ARFID emerged, making up 48.7% of ICD-11 restrictive eating disorders. All ICD-10 FD ($n = 21$) and 46.3% ($n = 19$) of ICD-10 rrED were reclassified to ICD-11 ARFID.

3.3 | Comparative analysis of patients reclassified to ICD-11 ARFID versus those reclassified to ICD-11 AN

Given the small sample size of patients reclassified to ICD-11 AN ($n = 5$), additional analyses were made to explore whether it would be appropriate to combine patients reclassified to ICD-11 AN and those with a stable classification of AN under ICD-10 and ICD-11 ($n = 20$). Therefore, these groups were compared in all study variables. Based on significant differences for sex ($p < .05$) and antecedents in medical histories ($p < .05$; see Tables 3 and 4) as well as medium-to-large-sized effects for BMI-SDS, somatic discomfort (GBB-KJ), emotional undereating (CEBQ), and shape concern (EDY-Q Feeling fat), it was deemed inadequate to combine both AN groups. Therefore, in addition to comparative analyses between patients reclassified to ICD-11 ARFID versus those reclassified to ICD-11 AN, we examined differences between patients with ICD-11 ARFID and a stable classification of AN according to ICD-10 and ICD-11 for explorative purposes.

As depicted in Tables 3 and 4, comparative analyses between patients reclassified to ICD-11 ARFID versus those reclassified to ICD-11 AN showed that patients reclassified to ICD-11 ARFID were significantly younger ($p < .05$), had an earlier age of illness onset ($p < .05$), more restrictive eating behaviors (CEBQ Food fussiness, Satiety responsiveness, Emotional undereating; EDY-Q mean score; $p < .05$), and lower shape concern (EDY-Q Feeling fat; $p < .001$) than those reclassified to ICD-11 AN, with medium-to-large-sized effects.

Nonsignificant, but medium-sized differences were seen for more somatic discomfort (GBB-KJ) and more somatic comorbidity, specifically gastrointestinal diseases, in those reclassified to ICD-11 ARFID

TABLE 2 Distribution of restrictive eating disorders according to ICD-10 and ICD-11.

	ICD-11					Post hoc pairwise comparisons ICD-10 vs. ICD-11		
	AN (row %)	ARFID (row %)	rrED (row %)	Total (column %)	Omnibus test	AN	FD/ARFID	rrED
ICD-10					$\chi^2(3) = 24.000$, $p < .001$	$p = .063$	$p = 1$	$p < .001$
AN	20 (100%)	0	0	20 (24.4%)				
FD	0	21 (100%)	0	21 (25.6%)				
rrED	5 (12.2%)	19 (46.3%)	17 (41.5%)	41 (50.0%)				
Total	25 (30.5%)	40 (48.8%)	17 (20.7)	82				

Note: McNemar (Bowker) tests were applied. Statistical significance for post-hoc tests was set at $\alpha < .017$.
Abbreviations: AN, anorexia nervosa; ARFID, avoidant/restrictive food intake disorder; FD, feeding disorder; ICD, International Classification of Diseases; rrED, residual restrictive eating disorders (atypical AN, other specified or unspecified restrictive eating disorder).

TABLE 3 Sociodemographics, medical characteristics, and psychological characteristics of patients with a reclassification from ICD-10 to ICD-11 restrictive eating disorders.

	ICD-10 rrED to ICD-11 ARFID	*n*	ICD-10 rrED to ICD-11 AN	*n*	ICD-10 and ICD-11 AN	*n*
Sociodemographics						
Age at interview, years (*M*, *SD*)	10.6 (5.5)	19	15.3 (1.5)	5	15.2 (1.6)	20
Sex, male (*n*, %)	7 (36.8)	19	1 (20.0)	5	0 (0.0)	20
Clinical variables (*M*, *SD*)						
Age of illness onset, years	6.8 (5.7)	19	14.0 (1.2)	5	12.8 (4.6)	20
BMI, SDS	−1.4 (1.2)	19	−0.8 (1.0)	5	−1.6 (1.1)	20
GBB-KJ—Somatic discomfort	12.6 (6.3)	15	8.4 (7.4)	5	14.3 (8.1)	20
Medical characteristics (*n*, %)						
Mental comorbidities	9 (47.4)	19	1 (20.0)	5	8 (40.0)	20
Affective disorders	8 (42.1)	19	1 (20.0)	5	6 (30.0)	20
ADHD	2 (10.5)	19	0 (0.0)	5	0 (0.0)	20
OCD	1 (5.3)	19	0 (0.0)	5	2 (10.0)	20
Anxiety disorders	0 (0.0)	19	0 (0.0)	5	2 (10.0)	20
PDD	0 (0.0)	19	0 (0.0)	5	0 (0.0)	20
Somatic comorbidities	9 (47.4)	19	0 (0.0)	5	2 (10.0)	20
Gastrointestinal diseases	7 (36.8)	19	0 (0.0)	5	0 (0.0)	20
Metabolic disorders	3 (15.8)	19	0 (0.0)	5	1 (5.0)	20
Congenital anomalies	2 (10.5)	19	0 (0.0)	5	1 (5.0)	20
Antecedents in medical histories	5 (26.3)	19	1 (20.0)	5	0 (0.0)	20
Eating disorder psychopathology (*M*, *SD*)						
CEBQ—Food Avoidance Scales						
Slowness in eating	2.6 (0.8)	15	2.5 (1.1)	5	2.1 (0.8)	20
Food fussiness	2.5 (0.6)	15	1.8 (0.6)	5	1.7 (1.0)	20
Satiety responsiveness	2.8 (0.5)	15	2.1 (0.5)	5	2.2 (0.9)	19
Emotional undereating	2.4 (1.0)	15	0.8 (0.7)	5	1.7 (0.9)	19
EDY-Q—Restrictive eating symptoms						
Total mean score	3.0 (1.0)	14	2.5 (0.5)	5	2.3 (0.9)	20
Shape concern (feeling fat)	0.4 (0.9)	13	6.0 (0.0)	5	5.1 (1.4)	19

Abbreviations: ADHD, attention-deficit/hyperactivity disorder; AN, anorexia nervosa; ARFID, avoidant/restrictive food intake disorder; BMI, body mass index (kg/m^2); CEBQ, Child Eating Behavior Questionnaire; EDY-Q, Eating Disorders in Youth-Questionnaire; GBB-KJ, Giessen Physical Complaint List for Children and Adolescents; ICD, International Classification of Diseases; OCD, obsessive compulsive disorder; PDD, pervasive developmental disorders; rrED, residual restrictive eating disorders (atypical AN, other specified or unspecified restrictive eating disorder); SDS, standard deviation score.

TABLE 4 Comparative analysis on patients with a reclassification from ICD-10 to ICD-11 restrictive eating disorders.

	ICD-10 rrED to ARFID vs. ICD-10 rrED to ICD-11 AN			ICD-10 rrED to ARFID vs. ICD-10 and ICD-11 AN			ICD-10 rrED to ICD-11 AN vs. ICD-10 and ICD-11 AN		
	Statistics	***p***	**|*ES*|**	**Statistics**	***p***	**|*ES*|**	**Statistics**	***p***	**|*ES*|**
Sociodemographics									
Age at interview, years	$U = 18.500$	.036	0.93	$U = 81.000$	.002	1.13	$U = 49.000$	.974	0.03
Sex, male	$\chi^2(1, N = 24) = 0.505$	.477	0.15	$\chi^2(1, N = 39) = 8.980$	.003	0.48	$\chi^2(1, N = 25) = 4.167$	.041	0.41
Clinical variables									
Age of illness onset, years	$U = 13.000$	.012	1.16	$U = 80.000$	.002	1.14	$U = 46.000$	.818	0.11
BMI, SDS	$t(7.19) = 0.0388$	.515	0.51	$t(36.0) = -1.134$	.132	0.17	$U = 30.000$	.192	0.57
GBB-KJ—Somatic discomfort	$U = 22.000$	.197	0.64	$F(1, 33) = 0.449$	.507	0.23	$U = 28.500$	.148	0.61
Medical characteristics									
Mental comorbidities	$\chi^2(1, N = 24) = 1.220$	.269	0.23	$\chi^2(1, N = 39) = 0.215$	.643	0.07	$\chi^2(1, N = 25) = 0.694$	.405	0.17
Affective disorders	$\chi^2(1, N = 24) = 0.825$	.364	0.19	$\chi^2(1, N = 39) = 0.620$	.431	0.13	$\chi^2(1, N = 25) = 0.198$	.656	0.09
ADHD	$\chi^2(1, N = 24) = 0.574$	.449	0.16	$\chi^2(1, N = 39) = 2.219$	.136	0.24	–		
OCD	$\chi^2(1, N = 24) = 0.275$	.600	0.11	$\chi^2(1, N = 39) = 0.308$	.579	0.09	$\chi^2(1, N = 25) = 0.543$	.461	0.15
Anxiety disorders	–			$\chi^2(1, N = 39) = 2.003$	.157	0.23	$\chi^2(1, N = 25) = 0.543$	.461	0.15
PDD	–			–			–		
Somatic comorbidities	$\chi^2(1, N = 24) = 3.789$	.052	0.40	$\chi^2(1, N = 39) = 6.719$	.010	0.42	$\chi^2(1, N = 25) = 0.543$	.461	0.15
Gastrointestinal diseases	$\chi^2(1, N = 24) = 2.601$	.107	0.33	$\chi^2(1, N = 39) = 8.980$	.003	0.48	–		
Metabolic disorders	$\chi^2(1, N = 24) = 0.902$	.342	0.19	$\chi^2(1, N = 39) = 1.232$	.267	0.18	$\chi^2(1, N = 25) = 0.260$	.610	0.10
Congenital anomalies	$\chi^2(1, N = 24) = 0.574$	.449	0.16	$\chi^2(1, N = 39) = 0.419$	.517	0.10	$\chi^2(1, N = 25) = 0.260$	.610	0.10
Antecedents in medical histories	$\chi^2(1, N = 24) = 0.084$	.772	0.06	$\chi^2(1, N = 39) = 6.037$	.014	0.39	$\chi^2(1, N = 25) = 4.167$	.041	0.41
Eating disorder psychopathology									
CEBQ—Food Avoidance Scales									
Slowness in eating	$U = 32.000$	.672	0.22	$F(1, 33) = 3.814$	.059	0.63	$U = 36.000$	.371	0.39
Food fussiness	$U = 14.500$	.042	1.01	$F(1, 33) = 7.902$	.008[a]	0.94	$U = 42.000$	.621	0.22
Satiety responsiveness	$U = 13.500$	.033	1.06	$F(1, 32) = 5.294$	.028	0.80	$U = 43.500$	.783	0.12
Emotional undereating	$U = 8.000$	.008	1.41	$U = 80.000$	.030	0.71	$U = 20.000$	.053	0.87
EDY-Q—Restrictive eating symptoms									
Total mean score	$U = 20.500$	.186	0.65	$F(1, 32) = 4.256$	.047	0.74	$U = 44.500$	.717	0.15
Shape concern (feeling fat)	$U = 0.000$	<.001	2.30	$F(1, 30) = 115.014$	<.001	3.84	$U = 27.500$	.160	0.61

Note: For effect size (ES), *Cramér's V* or *d* was reported for categorical or continuous variables. Statistical significance for analyses on specific mental or somatic comorbidity was set at $\alpha < .010$ or $\alpha < .017$ due to multiple comparisons.

Abbreviations: ADHD, attention-deficit/hyperactivity disorder; AN, anorexia nervosa; ARFID, avoidant/restrictive food intake disorder; BMI, body mass index (kg/m^2); CEBQ, Child Eating Behavior Questionnaire; EDY-Q, Eating Disorders in Youth-Questionnaire; *F*, *F*-ratio; GBB-KJ, Giessen Physical Complaint List for Children and Adolescents; ICD, International Classification of Diseases; OCD, obsessive compulsive disorder; PDD, pervasive developmental disorders; rrED, residual restrictive eating disorders (atypical AN, other specified or unspecified restrictive eating disorder); SDS, standard deviation score; *t*, *t*-test value; *U*, Mann–Whitney test value; χ^2, Chi square test value.

[a]Considering covariate age at interview and sex: $F(1, 33) = 2.920$, $p = .096$.

TABLE 5 Sociodemographics, medical characteristics, and psychological characteristics for patients with residual restrictive eating disorders according to ICD-10 or ICD-11.

					Comparative analysis		
	ICD-10 rrED[a]	*n*	ICD-11 rrED[b]	*n*	Statistics	*p*	|*ES*|
Sociodemographics							
Age at interview, years (*M*, *SD*)	11.55 (5.24)	24	7.51 (6.05)	17	$F(1, 39) = 5.178$	.028	0.72
Sex, male (*n*, %)	8 (33.3)	24	7 (41.2)	17	$\chi^2(1, N = 41) = 0.264$	.607	0.08
Clinical variables (*M*, *SD*)							
Age of illness onset, years	8.27 (5.93)	24	4.23 (5.73)	17	$F(1, 39) = 4.755$	.035	0.69
BMI, SDS	−1.30 (1.19)	24	−1.24 (1.44)	17	$F(1, 39) = 0.020$	.888	0.05
GBB-KJ—Somatic discomfort	11.55 (6.67)	20	10.18 (8.73)	17	$F(1, 35) = 0.294$	.591	0.18
Medical characteristics (*n*, %)							
Mental comorbidities	10 (41.7%)	24	4 (23.5)	17	$\chi^2(1, N = 41) = 1.456$	.228	0.19
Affective disorders	9 (37.5)	24	3 (17.6)	17	$\chi^2(1, N = 41) = 1.895$	.169	0.22
ADHD	2 (8.3)	24	0 (0.0)	17	$\chi^2(1, N = 41) = 1.489$	.222	0.19
OCD	1 (4.2)	24	1 (5.9)	17	$\chi^2(1, N = 41) = 0.063$	.802	0.04
Anxiety disorder	0 (0.0)	24	0 (0.0)	17			
PDD	0 (0.0)	24	1 (5.9)	17	$\chi^2(1, N = 41) = 1.447$	.229	0.19
Somatic comorbidities	9 (37.5)	24	12 (70.6)	17	$\chi^2(1, N = 41) = 4.361$	.037	0.33
Gastrointestinal diseases	7 (29.2)	24	7 (41.2)	17	$\chi^2(1, N = 41) = 0.638$	.424	0.13
Metabolic disorders	3 (12.5)	24	2 (11.8)	17	$\chi^2(1, N = 41) = 0.005$	.943	0.01
Congenital anomalies	2 (8.3)	24	6 (35.3)	17	$\chi^2(1, N = 41) = 4.606$	.032	0.34
Antecedents in medical histories	6 (25.0)	24	7 (41.2)	17	$\chi^2(1, N = 41) = 1.203$	.273	0.17
Eating disorder psychopathology (*M*, *SD*)							
CEBQ—Food Avoidance Scales							
Slowness in eating	2.58 (0.84)	20	2.30 (0.88)	17	$F(1, 35) = 0.938$	.339	0.33
Food fussiness	2.34 (0.67)	20	2.05 (0.90)	17	$F(1, 35) = 1.252$	.271	0.37
Satiety responsiveness	2.62 (0.59)	20	2.32 (0.77)	17	$F(1, 35) = 1.845$	.183	0.44
Emotional undereating	2.03 (1.20)	20	1.75 (1.02)	17	$F(1, 35) = 0.551$	.463	0.25
EDY-Q—Restrictive eating symptoms							
Total mean score	2.84 (0.91)	19	2.55 (1.25)	17	$F(1, 34) = 0.665$	.421	0.27
Shape concern (feeling fat)	1.94 (2.69)	18	0.06 (0.25)	16	$U = 86.000$	.010	0.73

Note: For effect size (ES), Cramér's *V* or *d* was reported for categorical or continuous variables. Statistical significance for analyses on specific mental or somatic comorbidity was set at $\alpha < .010$ or $\alpha < .017$ due to multiple comparisons.

Abbreviations: ADHD, attention-deficit/hyperactivity disorder; CEBQ, Child eating behavior questionnaire; EDY-Q, Eating Disorders in Youth-Questionnaire; *F*, *F*-ratio; GBB-KJ, Giessen Physical Complaint List for Children and Adolescents; ICD, International Classification of Diseases; OCD, obsessive compulsive disorder; PDD, pervasive developmental disorders; rrED, residual restrictive eating disorders (atypical AN, other specified or unspecified restrictive eating disorders); *U*, Mann–Whitney test value; χ^2, Chi square test value.

[a]Data refer to patients with a reclassification from ICD-10 rrED to ICD-11 AN or ARFID.

[b]Data refer to patients with rrED according to both ICD-10 and ICD-11.

versus those reclassified to ICD-11 AN. Other results were nonsignificant and of small or negligible effect size.

3.4 | Comparative analysis of patients reclassified to ICD-11 ARFID versus patients with ICD-10 and ICD-11 AN

Additional analyses comparing patients reclassified from ICD-10 rrED to ICD-11 ARFID ($n = 19$) versus those with a stable classification of AN according to ICD-10 and ICD-11 ($n = 20$) mostly confirmed the results observed above (see Tables 3 and 4). In addition, patients reclassified to ICD-11 ARFID were significantly more likely to be male ($p < .01$), and presented with significantly more gastrointestinal diseases ($p < .01$) and antecedents in medical histories ($p < .05$) than those with a stable classification of AN, with medium-sized effects.

3.5 | Residual restrictive eating disorder diagnoses according to ICD-10 or ICD-11

Patients with rrED according to both ICD-10 and ICD-11 were significantly younger at the time of the interview ($p < .05$), had an earlier

age of illness onset ($p < .05$), presented with more somatic comorbidities ($p < .05$), and lower levels of feeling fat than patients who were reclassified from ICD-10 rrED to ICD-11 AN or ARFID, see Table 5.

4 | DISCUSSION

Within a sample of $N = 82$ children and adolescents seeking in- or outpatient treatment for restrictive eating disorders, this study highlighted (1) the inclusive approach of ICD-11 criteria with a remarkable reduction of ICD-10 rrED due to an increase of ICD-11 full-threshold disorders (AN, ARFID), (2) characteristics that differentiate between patients reclassified to ICD-11 ARFID versus those reclassified to ICD-11 AN, and (3) between patients who were reclassified from ICD-10 rrED to ICD-11 AN or ARFID versus those with rrED according to both ICD-10 and ICD-11. Specifically, age at interview, age of illness onset, somatic comorbidities, and eating disorder psychopathology were found to provide important differentiating information for ICD-11 reclassifications.

To our knowledge, this is the first study to examine the distribution of restrictive eating disorders based on ICD-10 and ICD-11 criteria. As expected, there was a significant reduction of ICD-10 rrED by 29.3% and an increase of ICD-11 full-threshold AN by 6.2%, which is consistent with findings evaluating diagnostic crossover following DSM criteria, demonstrating a reduction of residual eating disorders by between 8 and 30% and an increase of full-threshold AN by between 2.5% and 25% (e.g., Caudle et al., 2015; Gualandi et al., 2016; Machado et al., 2013). The present results thus validate the proposed intentions of the revised ICD criteria to reduce residual eating disorders. Specifically, the fact that 12.2% of patients with ICD-10 rrED were reclassified to full-threshold ICD-11 AN indicates the successful broadening of ICD-11 AN diagnostic criteria. In the present study and similar to findings in studies using DSM criteria (Caudle et al., 2015; Gualandi et al., 2016; Nakai et al., 2013), the crossover to ICD-11 AN was due to the removal of the amenorrhea criterion. This criterion was not applicable to, for example, men and premenarchal women, or when taking contraceptives, and thus led to a classification into ICD-10 atypical anorexia (Gradl-Dietsch et al., 2020; Knoll et al., 2014; Reed et al., 2019).

As expected, the great majority of rrED was reclassified to ICD-11 ARFID, including children who were previously excluded from ICD-10 FD due to higher weight resulting from oral nutritional supplementation or tube feeding (WHO, 2022; Williams et al., 2015), supporting ARFID's high diagnostic utility (Claudino et al., 2019). The result that all patients with previous ICD-10 FD were reclassified to ARFID suggests that ICD-11 ARFID criteria are capable to capture symptoms across age ranges, as intended by the life span approach of the ICD-11 and DSM-5 and may adequately replace the former classification of ICD-10 FD. This might ease concerns of specialists in the field of feeding disorders in childhood who questioned the applicability of ARFID criteria to feeding disorders and proposed alternative criteria (Goday et al., 2019).

The number of patients with ICD-10 rrED reclassified to ICD-11 AN was substantially smaller than the number of patients reclassified to ICD-11 ARFID, which is generally in line with findings by Ornstein et al. (2013), but more pronounced in the present study including younger patients (0–17 vs. 8–21 years). To the best of our knowledge, there are no further studies reporting the number of patients with residual eating disorders who were reclassified to ARFID or AN based on DSM or ICD criteria. Given that only 5 patients were reclassified to ICD-11 AN, analyses comparing patients reclassified to ICD-11 ARFID to those reclassified to ICD-11 AN should be seen as preliminary and warrant replication in larger samples.

The comparative analysis on patients reclassified from ICD-10 rrED to ICD-11 ARFID versus those reclassified to ICD-11 AN revealed specific differentiating characteristics. In line with studies using DSM-5 criteria (e.g., Becker et al., 2019; Cañas et al., 2021; Zanna et al., 2021), patients reclassified to ICD-11 ARFID were significantly younger and had an earlier age of illness onset than those reclassified to ICD-11 AN. Contrary to our hypothesis, no significant differences were found for sex, which might be due to the small sample size of the present study. Patients reclassified to ICD-11 ARFID or ICD-11 AN did not show equivalent BMI-SDS, when considering equivalence boundaries of medium effect size, contrasting expectations and previous evidence (Schmidt et al., 2022). Previous literature showed either nonsignificantly different (e.g., Nicely et al., 2014; Norris et al., 2014; Ornstein et al., 2017) or higher body weight status (e.g., Becker et al., 2019; Cañas et al., 2021; Zanna et al., 2021) for patients with ARFID versus AN. Notably, the comparison of studies analyzing patients' weight status might be biased by different rates of patients receiving oral nutritional supplements or enteral feeding. Compared to previous studies of ARFID including outpatient or community samples only (e.g., Becker et al., 2019; Schmidt et al., 2019), 62.5% ($n = 25$) of patients with ARFID in this study sought inpatient treatment possibly leading to lower weight status.

Regarding medical characteristics, patients reclassified to ICD-11 ARFID versus those reclassified to ICD-11 AN tended to present with higher rates of somatic comorbidities (47.4% vs. 0.0%) as well as higher levels of children's somatic discomfort—both nonsignificant, but with medium-sized effects. This is in line with previous studies indicating more somatic comorbidities, especially higher rates of gastrointestinal diseases (e.g., Fisher et al., 2014; Lieberman et al., 2019), for children with ARFID than for patients with AN. The lack of differences in antecedents in medical history was unexpected (26.3% vs. 20.0%), indicating that this characteristic might be less helpful to differentiate between patients reclassified from rrED to ICD-11 ARFID and those reclassified to ICD-11 AN. In general, mental comorbidity was high (47.4% and 20.0%) in both patients reclassified to ICD-11 ARFID and ICD-11 AN, but contrary to previous evidence (e.g., Cañas et al., 2021; Nicely et al., 2014), no significant differences were found for specific mental comorbidities. Notably, mean age at interview for patients in this study was lower than in most previous comparative studies. In this context, it must be considered that mental disorders in young children might be underestimated due to their

complex nature as well as challenges in assessment and diagnostic classification in general (von Klitzing et al., 2015).

As expected, patients reclassified to ICD-11 ARFID presented with significantly higher levels of food avoidance behaviors (CEBQ) for food fussiness, satiety responsiveness, and emotional undereating than those reclassified to ICD-11 AN, indicating a behavioral distinctiveness for a classification into ICD-11 ARFID or ICD-11 AN. Besides, although nonsignificantly, patients reclassified to ICD-11 ARFID tended to show higher levels of restrictive eating disturbances with medium effect than patients reclassified to ICD-11 AN as assessed by the EDY-Q, which explicitly captures symptoms of ARFID and thus confirms the diagnostic crossover to ARFID. Consistent with the DSM-5 (APA, 2013) and ICD-11 (WHO, 2022), patients reclassified to ICD-11 ARFID expressed significantly lower levels of feeling fat than those reclassified to ICD-11 AN.

The results on analyses including only patients who were reclassified from ICD-10 rrED to ICD-11 ARFID or AN were mostly replicated by additional analyses comparing patients with an ICD-10 rrED to ICD-11 ARFID versus those with a stable classification of AN according to ICD-10 and ICD-11. However, while patients reclassified to ICD-11 ARFID versus those with a stable classification of AN presented with significantly more somatic comorbidities, no significant differences were found for the level of somatic discomfort (GBB-KJ). This may be explained by the symptoms captured by the GBB-KJ. While patients' comorbidities based on medical record mostly describe longstanding gastrointestinal diseases and metabolic disorders or congenital anomalies, typical for ARFID (APA, 2013), the GBB-KJ includes a variety of acute symptoms (e.g., palpitations, insomnia, weakness), which are well-known symptoms in AN as well (APA, 2013). In line with previous literature (e.g., Cañas et al., 2021; Fisher et al., 2014.), patients reclassified to ARFID versus those with a stable classification of AN were more likely to be male and had significantly more antecedents in medical history (26.3% vs. 0.0%).

The differences in comparative analyses between patients reclassified to ARFID and patients reclassified to AN versus patients with a stable classification of AN seem reasonable considering the differences that were found within the group of patients with ICD-11 AN including patients who were reclassified and who were not reclassified. In fact, patients with a stable classification of AN according to ICD-10 and ICD-11 were significantly more female than those with ICD-11 AN only. A stable versus new classification of AN was associated with nonsignificant, but medium-sized higher levels of somatic discomfort (GBB-KJ) and significantly less antecedents in medical history, which may indicate differentiating somatic characteristics, with acute somatic symptoms as assessed by the GBB-KJ tending to be more present in patients with a stable classification of AN, while for patients reclassified to ICD-11 AN, early childhood medical conditions might play a major role. Furthermore, patients with a stable classification of AN had a nonsignificantly, but medium-sized lower BMI-SDS than those with ICD-11 AN only, which is in line with Ornstein et al. (2013) using DSM criteria. Patients with a stable classification of AN also presented with nonsignificant, but medium-to-large-sized higher emotional undereating (CEBQ) as well as less shape concern (EDY-Q Feeling fat) than patients reclassified to ICD-11 AN. In the absence of available evidence providing deeper comparative analyses on children and adolescents with ICD-11 AN based on their ICD-10 label, these results mirror intended effects of diagnostic revisions for AN and show that the broadening of diagnostic criteria for AN according to ICD-11 may lead to a more heterogenous diagnostic group of individuals with AN. However, further research with larger sample sizes is needed to support the present findings.

Explorative analyses on the effects of diagnostic revisions on rrED showed that patients with rrED according to both ICD-10 and ICD-11 were significantly younger and had an earlier age of illness onset than patients who were reclassified from ICD-10 rrED to ICD-11 AN or ARFID, indicating that particularly older patients were reclassified from ICD-10 rrED to ICD-11 full-threshold disorders. In addition, patients with rrED according to both ICD-10 and ICD-11 relative to patients who were reclassified from ICD-10 rrED to ICD-11 AN or ARFID were characterized by higher rates of somatic comorbidities and lower levels of feeling fat, which may be related to the younger age at interview, and by diagnostic crossover from ICD-10 atypical AN to ICD-11 full-threshold AN. Thus, patients with ICD-11 versus ICD-10 rrED appear more homogenous, now especially including younger children with somatic problems that result in restrictive food intake, while shape concern plays a minor role.

Among the strengths of this study are the use of semistructured diagnostic interviews, well-established questionnaires, and objective anthropometrics. The inclusion of children and adolescents aged 0–17 years extends previous research with a focus on individuals >6 years of age, especially since ARFID replaced FD. However, the relatively small sample size did not allow more fine-grained analyses, especially when considering patients reclassified to ICD-11 AN, and was only powered to detect large-sized differences between different diagnostic classifications. Due to the low percentage of immigrants in Eastern Germany (<10%; Federal Statistical Office of Germany, 2022), the results may not be generalizable to other countries. Lacking information on gender, race, and ethnicity did not allow a more accurate description of the sample. Measures may not be totally appropriate for comparing toddlers and adolescents, which might have led to some missing items in questionnaires. As the EDE and its ARFID module are based on DSM criteria, the development of a study-specific diagnostic sheet to elicit ICD diagnoses was required, which has not been validated before. Some interviews were conducted by telephone ($n = 27$, 90.0% with parents) and it is unclear how this might have affected interview outcomes. In terms of interview duration, however, no significant differences were observed compared to face-to-face interviews (47.1 min vs. 48.7 min, $p = .594$). Finally, comorbidities were coded based on chart reviews only lacking information on severity and accuracy.

In sum, this study provided first empirical data on the consequences of the revision of ICD criteria for restrictive eating disorders, validating that proposed intentions of the revision were fulfilled, highlighting the diagnostic relevance of the newly introduced ARFID. Clinically, the results provide differentiating information on patient characteristics that are related to diagnostic crossover from rrED to

ICD-11 ARFID or AN. In terms of rrED, the results may pave the way for a more precise description of the patient group based on ICD-11 versus ICD-10 criteria and potentially more targeted treatment. Future studies in larger clinical samples including patients across ages and nonrestrictive eating disorders as well may allow further analyses on diagnostic crossover and clinical implications of the revised ICD-11 chapter of feeding or eating disorders in its life span approach.

AUTHOR CONTRIBUTIONS

Dominik Düplois: Conceptualization; data curation; formal analysis; investigation; methodology; writing – original draft; writing – review and editing. **Luise Brosig:** Data curation; investigation; writing – review and editing. **Andreas Hiemisch:** Investigation; writing – review and editing. **Wieland Kiess:** Writing – review and editing. **Anja Hilbert:** Conceptualization; funding acquisition; methodology; project administration; resources; supervision; writing – review and editing. **Franziska Schlensog-Schuster:** Investigation; methodology; writing – review and editing. **Ricarda Schmidt:** Conceptualization; data curation; formal analysis; investigation; methodology; project administration; supervision; writing – review and editing.

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CONFLICT OF INTEREST STATEMENT

The authors have no conflict to declare.

DATA AVAILABILITY STATEMENT

The data are available from the first author upon reasonable request.

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REFERENCES

American Psychiatric Association. (2013). *Diagnostic and statistical manual of mental disorders: DSM-5* (5th ed.). American Psychiatric Association.

Barkmann, C., & Brähler, E. (2009). *Gießener Beschwerdebogen für Kinder und Jugendliche; Manual*. Huber.

Barkmann, C., Mack, B., Brähler, E., & Schulte-Markwort, M. (2008). Der Gießener Beschwerdebogen für Kinder und Jugendliche (GBB-KJ): Faktorielle Validität, Reliabilität und gesamtdeutsche Normierung für 4- bis 18-Jährige im Eltern- und Selbsturteil. *Diagnostica*, *54*, 99–111. https://doi.org/10.1026/0012-1924.54.2.99

Becker, K. R., Keshishian, A. C., Liebman, R. E., Coniglio, K. A., Wang, S. B., Franko, D. L., Eddy, K. T., & Thomas, J. J. (2019). Impact of expanded diagnostic criteria for avoidant/restrictive food intake disorder on clinical comparisons with anorexia nervosa. *International Journal of Eating Disorders*, *52*, 230–238. https://doi.org/10.1002/eat.22988

Berg, K. C., Peterson, C. B., Frazier, P., & Crow, S. J. (2012). Psychometric evaluation of the eating disorder examination and eating disorder examination-questionnaire: A systematic review of the literature. *International Journal of Eating Disorders*, *45*, 428–438. https://doi.org/10.1002/eat.20931

Bourne, L., Bryant-Waugh, R., Cook, J., & Mandy, W. (2020). Avoidant/restrictive food intake disorder: A systematic scoping review of the current literature. *Psychiatry Research*, *288*, 112961. https://doi.org/10.1016/j.psychres.2020.112961

Bryant-Waugh, R. J., Cooper, P. J., Taylor, C. L., & Lask, B. D. (1996). The use of the eating disorder examination with children: A pilot study. *International Journal of Eating Disorders*, *19*, 391–397. https://doi.org/10.1002/(SICI)1098-108X(199605)19:4<391::AID-EAT6>3.0.CO;2-G

Cañas, L., Palma, C., Molano, A. M., Domene, L., Carulla-Roig, M., Cecilia-Costa, R., Dolz, M., & Serrano-Troncoso, E. (2021). Avoidant/restrictive food intake disorder: Psychopathological similarities and differences in comparison to anorexia nervosa and the general population. *European Eating Disorders Review*, *29*, 245–256. https://doi.org/10.1002/erv.2815

Caudle, H., Pang, C., Mancuso, S., Castle, D., & Newton, R. (2015). A retrospective study of the impact of DSM-5 on the diagnosis of eating disorders in Victoria, Australia. *Journal of Eating Disorders*, *3*, 35. https://doi.org/10.1186/s40337-015-0072-0

Chen, H., Cohen, P., & Chen, S. (2010). How big is a big odds ratio? Interpreting the magnitudes of odds ratios in epidemiological studies. *Communications in Statistics – Simulation and Computation*, *39*, 860–864. https://doi.org/10.1080/03610911003650383

Claudino, A. M., Pike, K. M., Hay, P., Keeley, J. W., Evans, S. C., Rebello, T. J., Bryant-Waugh, R., Dai, Y., Zhao, M., Matsumoto, C., Herscovici, C. R., Mellor-Marsá, B., Stona, A.-C., Kogan, C. S., Andrews, H. F., Monteleone, P., Pilon, D. J., Thiels, C., Sharan, P., … Reed, G. M. (2019). The classification of feeding and eating disorders in the ICD-11: Results of a field study comparing proposed ICD-11 guidelines with existing ICD-10 guidelines. *BMC Medicine*, *17*, 93. https://doi.org/10.1186/s12916-019-1327-4

Cole, T. J. (1990). The LMS method for constructing normalized growth standards. *European Journal of Clinical Nutrition*, *44*, 45–60.

Cousins, S., Blencowe, N. S., & Blazeby, J. M. (2019). What is an invasive procedure? A definition to inform study design, evidence synthesis and research tracking. *BMJ Open*, *9*, e028576. https://doi.org/10.1136/bmjopen-2018-028576

Fairburn, C. G., Cooper, Z., & O'Connor, M. E. (2014). *Eating Disorder Examination (Edition 17.0D)*. https://www.credo-oxford.com/pdfs/EDE_17.0D.pdf

Federal Statistical Office of Germany. (2022). *Bevölkerung in Privathaushalten nach Migrationshintergrund und Bundesländern*. Statistisches Bundesamt. https://www.destatis.de/DE/Themen/Gesellschaft-Umwelt/Bevoelkerung/Migration-Integration/Tabellen/migrationshintergrund-laender.html

Fisher, M. M., Rosen, D. S., Ornstein, R. M., Mammel, K. A., Katzman, D. K., Rome, E. S., Callahan, S. T., Malizio, J., Kearney, S., & Walsh, B. T. (2014). Characteristics of avoidant/restrictive food intake disorder in children and adolescents: A "new disorder" in DSM-5. *Journal of*

Adolescent Health, *55*, 49–52. https://doi.org/10.1016/j.jadohealth.2013.11.013

Goday, P. S., Huh, S. Y., Silverman, A., Lukens, C. T., Dodrill, P., Cohen, S. S., Delaney, A. L., Feuling, M. B., Noel, R. J., Gisel, E., Kenzer, A., Kessler, D. B., Kraus de Camargo, O., Browne, J., & Phalen, J. A. (2019). Pediatric feeding disorder: Consensus definition and conceptual framework. *Journal of Pediatric Gastroenterology and Nutrition*, *68*, 124–129. https://doi.org/10.1097/MPG.0000000000002188

Gradl-Dietsch, G., Herpertz-Dahlmann, B., Degenhardt, F., & Hebebrand, J. (2020). Feeding and eating disorders in ICD-11. *Zeitschrift fur Kinder- und Jugendpsychiatrie und Psychotherapie*, *1–10*, 443–452. https://doi.org/10.1024/1422-4917/a000772

Gualandi, M., Simoni, M., Manzato, E., & Scanelli, G. (2016). Reassessment of patients with eating disorders after moving from DSM-IV towards DSM-5: A retrospective study in a clinical sample. *Eating and Weight Disorders*, *21*, 617–624. https://doi.org/10.1007/s40519-016-0314-4

Hay, P. (2020). Current approach to eating disorders: A clinical update. *Internal Medicine Journal*, *50*, 24–29. https://doi.org/10.1111/imj.14691

Hilbert, A. (2016). Eating Disorder Examination for children. In *German Translation [Eating Disorder Examination für Kinder. Deutschsprachige Übersetzung]*. dgvt-Verlag.

Hilbert, A., Bürger, A., Hartmann, A. S., Spenner, K., Czaja, J., & Warschburger, P. (2013). Psychometric evaluation of the eating disorder examination adapted for children. *European Eating Disorders Review*, *21*, 330–339. https://doi.org/10.1002/erv.2221

Hilbert, A., & Tuschen-Caffier, B. (2016). Eating Disorder Examination. In *German Translation [Eating Disorder Examination. Deutschsprachige Übersetzung]*. dgvt-Verlag.

Hilbert, A., & van Dyck, Z. (2016). *Eating Disorders in Youth-Questionnaire. Deutsche version*. University of Leipzig. http://nbn-resolving.de/urn:nbn:de:bsz:15-qucosa-197236

Kambanis, P. E., Kuhnle, M. C., Wons, O. B., Jo, J. H., Keshishian, A. C., Hauser, K., Becker, K. R., Franko, D. L., Misra, M., Micali, N., Lawson, E. A., Eddy, K. T., & Thomas, J. J. (2020). Prevalence and correlates of psychiatric comorbidities in children and adolescents with full and subthreshold avoidant/restrictive food intake disorder. *International Journal of Eating Disorders*, *53*, 256–265. https://doi.org/10.1002/eat.23191

Knoll, S., Föcker, M., & Hebebrand, J. (2014). Changes to the classification of eating disorders in DSM-5. *Zeitschrift fur Kinder- und Jugendpsychiatrie und Psychotherapie*, *42*, 361; quiz 367–368–366. https://doi.org/10.1024/1422-4917/a000311

Kromeyer-Hauschild, K., Wabitsch, M., Kunze, D., Geller, F., Geiß, H. C., Hesse, V., von Hippel, A., Jaeger, U., Johnsen, D., Korte, W., Menner, K., Müller, G., Müller, J. M., Niemann-Pilatus, A., Remer, T., Schaefer, F., Wittchen, H.-U., Zabransky, S., Zellner, K., … Hebebrand, J. (2001). Perzentile für den Body-mass-Index für das Kindes- und Jugendalter unter Heranziehung verschiedener deutscher Stichproben. *Monatsschrift Kinderheilkunde*, *149*, 807–818. https://doi.org/10.1007/s001120170107

Lakens, D., Scheel, A. M., & Isager, P. M. (2018). Equivalence testing for psychological research: A tutorial. *Advances in Methods and Practices in Psychological Science*, *1*, 259–269. https://doi.org/10.1177/2515245918770963

Lieberman, M., Houser, M. E., Voyer, A.-P., Grady, S., & Katzman, D. K. (2019). Children with avoidant/restrictive food intake disorder and anorexia nervosa in a tertiary care pediatric eating disorder program: A comparative study. *International Journal of Eating Disorders*, *52*, 239–245. https://doi.org/10.1002/eat.23027

Loeb, K. L. (2016). *Eating Disorder Examination-Parent version (P-EDE, version 2.0)*. Fairleigh Dickinson University.

Machado, P. P. P., Gonçalves, S., & Hoek, H. W. (2013). DSM-5 reduces the proportion of EDNOS cases: Evidence from community samples. *International Journal of Eating Disorders*, *46*, 60–65. https://doi.org/10.1002/eat.22040

Nakai, Y., Fukushima, M., Taniguchi, A., Nin, K., & Teramukai, S. (2013). Comparison of DSM-IV versus proposed DSM-5 diagnostic criteria for eating disorders in a Japanese sample. *European Eating Disorders Review*, *21*, 8–14. https://doi.org/10.1002/erv.2203

Nicely, T. A., Lane-Loney, S., Masciulli, E., Hollenbeak, C. S., & Ornstein, R. M. (2014). Prevalence and characteristics of avoidant/restrictive food intake disorder in a cohort of young patients in day treatment for eating disorders. *Journal of Eating Disorders*, *2*, 21. https://doi.org/10.1186/s40337-014-0021-3

Norris, M. L., Robinson, A., Obeid, N., Harrison, M., Spettigue, W., & Henderson, K. (2014). Exploring avoidant/restrictive food intake disorder in eating disordered patients: A descriptive study. *International Journal of Eating Disorders*, *47*, 495–499. https://doi.org/10.1002/eat.22217

Ornstein, R. M., Essayli, J. H., Nicely, T. A., Masciulli, E., & Lane-Loney, S. (2017). Treatment of avoidant/restrictive food intake disorder in a cohort of young patients in a partial hospitalization program for eating disorders. *International Journal of Eating Disorders*, *50*, 1067–1074. https://doi.org/10.1002/eat.22737

Ornstein, R. M., Rosen, D. S., Mammel, K. A., Callahan, S. T., Forman, S., Jay, M. S., Fisher, M., Rome, E., & Walsh, B. T. (2013). Distribution of eating disorders in children and adolescents using the proposed DSM-5 criteria for feeding and eating disorders. *Journal of Adolescent Health*, *53*, 303–305. https://doi.org/10.1016/j.jadohealth.2013.03.025

Reed, G. M., First, M. B., Kogan, C. S., Hyman, S. E., Gureje, O., Gaebel, W., Maj, M., Stein, D. J., Maercker, A., Tyrer, P., Claudino, A., Garralda, E., Salvador-Carulla, L., Ray, R., Saunders, J. B., Dua, T., Poznyak, V., Medina-Mora, M. E., Pike, K. M., … Saxena, S. (2019). Innovations and changes in the ICD-11 classification of mental, behavioural and neurodevelopmental disorders. *World Psychiatry*, *18*, 3–19. https://doi.org/10.1002/wps.20611

Reed, G. M., Mendonça Correia, J., Esparza, P., Saxena, S., & Maj, M. (2011). The WPA-WHO global survey of psychiatrists' attitudes towards mental disorders classification. *World Psychiatry*, *10*, 118–131. https://doi.org/10.1002/j.2051-5545.2011.tb00034.x

Schmidt, R., Hiemisch, A., Kiess, W., von Klitzing, K., Schlensog-Schuster, F., & Hilbert, A. (2022). Validation study on the child, adult, and parent version of the ARFID module 2.0 for the Eating Disorder Examination. *International Journal of Eating Disorders*, *55*, 1708–1720. https://doi.org/10.1002/eat.23805

Schmidt, R., Kirsten, T., Hiemisch, A., Kiess, W., & Hilbert, A. (2019). Interview-based assessment of avoidant/restrictive food intake disorder (ARFID): A pilot study evaluating an ARFID module for the Eating Disorder Examination. *International Journal of Eating Disorders*, *52*, 388–397. https://doi.org/10.1002/eat.23063

Stein, D. J., Szatmari, P., Gaebel, W., Berk, M., Vieta, E., Maj, M., de Vries, Y. A., Roest, A. M., de Jonge, P., Maercker, A., Brewin, C. R., Pike, K. M., Grilo, C. M., Fineberg, N. A., Briken, P., Cohen-Kettenis, P. T., & Reed, G. M. (2020). Mental, behavioral and neurodevelopmental disorders in the ICD-11: An international perspective on key changes and controversies. *BMC Medicine*, *18*, 21. https://doi.org/10.1186/s12916-020-1495-2

Uher, R., & Rutter, M. (2012). Classification of feeding and eating disorders: Review of evidence and proposals for ICD-11. *World Psychiatry*, *11*, 80–92. https://doi.org/10.1016/j.wpsyc.2012.05.005

von Klitzing, K., Döhnert, M., Kroll, M., & Grube, M. (2015). Mental disorders in early childhood. *Deutsches Arzteblatt International*, *112*, 375–386. https://doi.org/10.3238/arztebl.2015.0375

Wardle, J., Guthrie, C. A., Sanderson, S., & Rapoport, L. (2001). Development of the children's eating behaviour questionnaire. *Journal of Child Psychology and Psychiatry*, *42*, 963–970. https://doi.org/10.1017/S0021963001007727

WHO. (2019). *International statistical classification of diseases and related health problems 10th revision*. World Health Organization. https://icd.who.int/browse10/2019/en

WHO. (2022). *ICD-11 for mortality and morbidity statistics (ICD-11 MMS)*. World Health Organization. https://icd.who.int/browse11/l-m/en

Williams, K. E., Hendy, H. M., Field, D. G., Belousov, Y., Riegel, K., & Harclerode, W. (2015). Implications of avoidant/restrictive food intake disorder (ARFID) on children with feeding problems. *Children's Health Care*, *44*, 307–321. https://doi.org/10.1080/02739615.2014.921789

Zanna, V., Criscuolo, M., Mereu, A., Cinelli, G., Marchetto, C., Pasqualetti, P., Tozzi, A. E., Castiglioni, M. C., Chianello, I., & Vicari, S. (2021). Restrictive eating disorders in children and adolescents: A comparison between clinical and psychopathological profiles. *Eating and Weight Disorders*, *26*, 1491–1501. https://doi.org/10.1007/s40519-020-00962-z

SUPPORTING INFORMATION

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