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Feeding difficulties in children with esophageal atresia: A parent-reported multicenter study

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Abstract

Objective: Feeding difficulties (FDs) are common among children with esophageal atresia (EA) and tracheoesophageal fistula (TEF), but knowledge about their prevalence and risk factors is limited. This multicenter study aimed to assess the prevalence, subtypes, and associated factors of FD in children with EA/TEF.

Methods: Parents of children who underwent surgery for EA/TEF in four tertiary centers in Israel (2005–2022) completed a structured questionnaire. Pediatric feeding disorder (PFD) was diagnosed by means of the Montreal Children's Hospital Feeding Scale and classified by consensus criteria into four subtypes: feeding skills, nutritional, medical, and psychosocial dysfunctions.

Results: Seventy-five children were included (median age: 40 months; 48 males), of whom 57 (76%) were reported to have FD, primarily due to impaired feeding skills (42%). Lower gestational age, low birth weight, and delayed oral feeding were significantly associated with PFD (37 vs. 39 weeks, $p = 0.001$, 2130 g versus 3084 g, $p = 0.001$ and 14 versus 10 days, $p = 0.05$, respectively). Only half of the children received timely and appropriate multidisciplinary follow-up care.

Conclusion: FDs are highly prevalent in children with EA/TEF, mostly due to impaired feeding skills. Several clinical and perinatal factors are associated with the development of these problems, calling for early and multidisciplinary intervention to improve outcomes.

KEYWORDS

feeding disorder, multidisciplinary intervention, pediatrics, tracheoesophageal fistula

1 | INTRODUCTION

Esophageal atresia (EA) and tracheoesophageal fistula (TEF) are rare congenital malformations of the upper gastrointestinal tract, occurring in approximately 1 in 2500–4500 live births.[1] Although surgical and neonatal care advances have markedly improved survival, feeding difficulties (FD) remain one of the most persistent and challenging long-term complications in this population.

Children with EA/TEF often experience multifactorial feeding problems arising from structural abnormalities, esophageal dysmotility, inflammatory conditions (e.g., Gastro-esophageal reflux disease or eosinophilic esophagitis), post-surgical sequelae (strictures, leaks, recurrent fistula, and vocal fold paralysis), and behavioral or sensory-based feeding aversions.[2] These difficulties frequently manifest as coughing, choking, prolonged mealtimes, food refusal, or selectivity, adversely affecting nutrition, growth, and family quality of life.[3–5]

FDs are common with increased prevalence even among typically developing children, affecting approximately 20%–30% of the general pediatric population and up to 80% of those with chronic medical or developmental conditions.[6–9] However, despite extensive clinical experience, current knowledge remains fragmented due to inconsistent terminology, lack of standardized assessment tools, and variable diagnostic criteria. The recent consensus definition of pediatric feeding disorder (PFD) offers a multidomain framework—medical, nutritional, feeding-skill, and psychosocial—that provides a structured way to evaluate and classify FD in children with EA/TEF.[10]

In recent years, several advancements have been made in the understanding and treatment of children with EA, including early oral stimulation and sham-feeding protocols, feeding skill training delivered by speech and occupational therapists, and multidisciplinary transition clinics integrating gastroenterology, nutrition, and psychology.[11–13] These approaches aim to facilitate safe oral feeding, enhance developmental skills, and reduce caregiver stress.

Accordingly, this multicenter parent-reported study aimed to characterize the prevalence, subtypes, and risk factors of PFD in children with EA/TEF using validated measures and standardized definitions, to inform future multidisciplinary care pathways and early intervention strategies.

What is Known

- Feeding difficulties are common in children with esophageal atresia and tracheoesophageal fistula (EA/TEF).
- Reported prevalence varies widely and is based on inconsistent definitions.

What is New

- 76% of children with EA/TEF met the recent WHO-based consensus criteria for pediatric feeding disorder (PFD).
- Impaired feeding skills emerged as the predominant PFD subtype and key risk factors—lower gestational age, lower birth weight, delayed initiation of oral feeding, and frequent esophageal dilations—were independently associated with PFD.
- Only half of affected children received timely multidisciplinary follow-up, highlighting a critical gap in care and the need to integrate structured feeding evaluation into EA/TEF management protocols.

2 | METHODS

2.1 | Ethics statement

The study protocol was approved by the TASMC institutional review board ("Helsinki"; reference number—TLV-0590-20). Informed consent of the participants was waived since the data retrieved from the questionnaires were anonymized. The data were handled in accordance with the Principles of Good Clinical Practice.

2.2 | Study design and participants

Parents of children operated for EA and/or TEA in four tertiary hospitals in Israel from 2005 to 2022 were reached through closed social media support groups for families of children with EA/TEF, moderated by patient representatives in collaboration with participating tertiary centers. A single standardized invitation post-describing the study and including a secure link to the questionnaire was shared in these groups. All complete questionnaires were included in the study, except those in which an alternative explanation for FD was identified (e.g., a known active mucosal disorder or another neurodevelopmental disorder).

A PFD was diagnosed based upon the Montreal Children's Hospital (MCH) feeding scale,[14] a 14-item validated parent report questionnaire used to identify infants and children with feeding problems. The division of PFD into four types was made according to the new accepted unifying diagnostic definition.[10] According to this definition, PFDs comprise impaired oral intake that is not age-appropriate and associated with medical, nutritional, feeding skill and/or psychosocial dysfunction.[10] The determination of the primary affected domain was made by the multidisciplinary team of the Infants and Children Feeding Disorder Clinic at Tel Aviv Sourasky Medical Center (TASMC), which included a pediatric gastroenterologist, dietitian, speech therapist and a psychologist. This decision was based on data obtained from standardized questionnaires.

2.3 | Data collection

The information in the questionnaire contains self-reported parental responses. The information retrieved from the questionnaire included:

1. Sociodemographic characteristics: the child's age at the time of completing the questionnaire, age at establishment of a feeding disorder, sex, home address, parental academic background, and socioeconomic status (SES).

TABLE 1 Demographic and clinical characteristics of the study cohort.

Characteristic	EA/TEF total group *n* = 75	Patients with EA/TEF and PFD *n* = 57 (76%)	Patients with EA/TEF without PFD *n* = 18 (24%)	*p*
Sex, male	48 (64)	35 (64)	13 (72)	0.32
Age, months	40 (17–100)	35 (15, 50)	42 (23–83)	0.20
Pregnancy complications	38 (50.6)	31 (54)	7 (38)	0.09
Polyhydramnion	30 (40)	24 (42)	6 (33)	0.25
Gestational age, weeks	38 (35–39)	37 (34, 38.7)	39 (38, 40)	0.001
Birth weight, gr	2460 (1800–3100)	2130 (1525, 2971)	3084 (2650, 3450)	0.001
Low birth weight	26 (45)	19 (33)	7 (38)	0.23
1st parent academic background	61 (82)	47 (84)	16 (98)	0.35
2nd parent academic background	62 (83)	40 (71)	10 (57)	0.21
Socioeconomic stats	0.625 (0.125, 1.18)	0.74 (0.23, 1.18)	0.44 (–0.8, 1.24)	0.73
Atresia type				0.54
A		6 (10)	0	
B		1 (1.7)	2 (11)	
C	63 (84)	47 (82)	16 (88)	
D		2 (3.5)	0	
E		1 (1.7)	0	
Associated anomalies	47 (62.7)	37 (65)	10 (55)	0.23
VACTERL association	11 (14.6)	7 (12)	4 (22)	0.32
Age at first procedure, days	2 (1–3)	14 (2, 30)	10 (2, 14)	0.09
Number of procedures	2 (1–3)	2 (1, 3)	1 (1, 4)	0.34
Postprocedure complications	21 (28)	5 (27)	16 (21.3)	0.67
Esophageal dilatations, *n*	54 (72)	45 (78)	9 (50)	0.05
Number of esophageal dilatations, *n*	2 (1.6)	3 (1.7)	1 (0.2)	0.01
Age at first oral feed, days	14 (2–30)	14 (2, 30)	10 (2, 14)	0.05
Type of first feed				0.34
Human milk	28 (37.3)	20 (35)	8 (44.4)	
Formula	26 (34.6)	19 (33.3)	7 (38.8)	
Combination	21 (28)	18 (31.5)	3 (16.6)	
Age at complementary food introduction, months	8 (6–10)	8 (6, 12)	8 (6, 10)	0.43
Food adjustments	48 (64)	37 (64)	11 (61)	0.20
Follow-up by a speech therapist/dietician during the first 6 months of life	39 (52)	31 (54)	8 (44)	0.16
Follow up by a speech therapist/dietician before starting complementary food	35 (46.6)	29 (50)	6 (33)	0.07

Note: The data are expressed as median and interquartile range for continuous variables and *n* (%) for categorical variables.

Abbreviations: EA/TEF, esophageal atresia/tracheoesophageal fistula; PFD, pediatric feeding disorder; VACTERL, vertebral defects, anal atresia, cardiac defects, tracheoesophageal fistula, esophageal atresia, renal anomalies, limb abnormalities.

2. Medical history: perinatal characteristics (pregnancy complications, delivery method, birth weight, gestational age [GA], and birth complications), EA and/or TEA procedural characteristics (age at first surgery, number of surgeries, number of esophageal dilations, and surgical complications), type of atresia, developmental status and associated anomalies (vertebral defects, anal atresia, cardiac defects, tracheoesophageal fistula [TEF], EA and renal anomalies, Limb abnormalities [VACTERL]).
3. Feeding history: feeding method, type of first feed, age of first oral feeding, age of introducing complementary food, characteristic of FD and follow-up by a dietician or speech therapist.

2.4 | Definition of study variables

Low birth weight (LBW) was defined as a BW < 2500 g. Prematurity was defined as GA < 37 weeks. Pregnancy complication was defined as any high-risk pregnancy due to maternal or fetal problems (e.g., gestational diabetes mellitus, preeclampsia, cholestasis, intrauterine growth retardation, multiple pregnancy, and polyhydramnion). Delivery complication was defined by the presence of maternal fever, premature rupture of membranes, shoulder dystocia or perinatal asphyxia. Surgical complications were defined by leakage, stenosis, perforation, infection, adhesions, vocal cord or diaphragmatic paralysis and pneumothorax. The SES was determined by the patient's home address according to the Israel Central Bureau of Statistics' Characterization and Classification of Statistical Areas within Municipalities and Local Councils by the Socio-Economic Level of the Population. The SES was scored by clusters of localities ranging from 1 to 10, with one being the lowest rating and 10 the highest. The SES index is an adjusted calculation of 14 variables that measure social and economic levels in the domains of demographics, education, standard of living, and employment (ranging from the lowest [−2.797] to the highest [2.590]). Academic background was defined according to the sociodemographic status of parents that completed tertiary education.

PFD was diagnosed according to the MCH feeding scale and divided into four types according to the consensus group definition as a disturbance in oral intake of nutrients inappropriate for age lasting for at least 2 weeks and an absence of cognitive processes consistent with eating disorders.[10] The type of the child's feeding disorder was defined by the TASMC clinical team based upon the information obtained from the parents' responses to the questionnaire. Those responses were retrospectively reviewed, and the feeding disorder types were divided into a nutritional disorder (any case of malnutrition, specific nutrient deficiency or reliance upon oral supplements to sustain nutrition), a feeding skill dysfunction (use of modified feeding strategies, body position or special food texture), a medical disorder (any medical conditions that could interfere with normal age-appropriate eating practice, e.g., aspirations, cardiorespiratory abnormality, anatomical malformations, etc.) and a psychosocial dysfunction (any case of avoidance behaviors when being fed or inappropriate caregiver management of the child's feeding). The code of the predominant type was used in cases of an overlap of PFD manifestations. There was disagreement between the team in fewer than 10% of the cases, and the dominant type was defined as the one that received the most votes.

2.5 | Statistical analysis

The data were analyzed with the Statistical Package for the Social Sciences software version 27 (SPSS Inc.). All statistical tests were two-sided. The Kolmogorov–Smirnov test and the Shapiro–Wilk test were applied to assess the normality of continuous data. The data are expressed as means ± standard deviation (SD) for normally distributed variables and median and interquartile range (IQR) for skewed distributions. Pearson's chi-square test or Fisher's exact test was performed to compare the distribution of categorical variables between children with PFD and children without PFD. An independent sample *t*-test or an independent sample Mann–Whitney was performed to compare between groups for continuous variables with a normal or a skewed distribution, as appropriate. A p-value < 0.05 was considered significant.

3 | RESULTS

3.1 | Study population

The questionnaire was sent to 98 parents of children with EA/TEF, of whom 75 responded (estimated response rate ~75%–80%). Table 1 lists the baseline characteristics of the study population which included 75 children (48 [64%] males) with EA/TEF. The median age of the children at the time the parent(s) completed the questionnaire was 40 months (IQR 17–100). The median gestation week was 38 (35–39) and the mean birth weight was 2460 g (1800–3100 g). Most of the patients had atresia type C (n = 64, 84%). Forty-seven patients (62.7%) had associated anomalies, and 11 patients (14.6%) had a complete VACTERL association. The first surgical procedure was performed at a median age of 2 days (1–3) and the median number of procedures was 2 (1–3). Twenty-one patients (28%) had post-procedure complications. The median age was 14 days (2–30) at the time of the first oral feed and 8 months (6–10) for the first solid food. Most of the

patients (64%) needed food adjustments, such as thickening and other texture modifications, small pieces, and so on. Notably, only 39 patients (52%) were regularly followed by a speech-language pathologist and only 35 patients (46.6%) were regularly followed by a dietitian during the first 6 months of life and before starting complementary food.

3.2 | Patients with EA/TEF and PFD

Of the 75 children included, 57 (76%) of the children were categorized as having PFD according to the MCH feeding scale. The median age at onset of the FD was 7 months (range 5–14 months. In 30 of those children (52.6%), the FD developed during the first months of life. The feeding difficulty was attributed to feeding skill dysfunction in 24 patients (42%), to nutritional dysfunction in 16 (28%) patients, to medical dysfunction in 10 (17%) patients and to psychosocial dysfunction in 7 (13%) (Figure 1).

3.3 | Factors associated with PFD in patients with TEF/EA

Table 1 depicts the comparison between patients with and without PFD. The mean GA and weight were significantly lower in patients with PFD compared with patients without PFD (GA 37 [34–8.75] vs. 39 [38–40] weeks and (2130 [1525–2971] vs. 3084 [2650–3450] g, $p = 0.001$, respectively). The age at the first feed was significantly younger in patients that did not develop PFD (10 [2–4] vs. 14 [2–30] days $p = 0.05$). More patients with PFD had at least one esophageal dilatation (45 [78%] vs. 9 [50%] $p = 0.05$) as well as a greater number of esophageal dilations compared with patients without PFD (3, IQR [1–7] vs. 1, IQR [0–2], $p = 0.01$). There was no significant difference in sex, atresia type, associated anomalies, age at first operation, operation complications, type of first feed, or age at starting complementary feeds, parental academic background or statuses between the children who did and those who did not develop PFD. Interestingly, FD were significantly more common in the group treated more than 7 years ago compared to the group that was treated during the last 7 years (98% of parents in the group treated more than 7 years ago compare to 68% the group that was treated during the last 7 years, $p = 0.039$).

3.4 | Current feeding status in patients with EA/TEF

Seventy-five parents of children with EA/TEF reported on their current feeding status at the time of questionnaire completion (median age of 40 months [IQR 17–100]). Thirty-four patients (45%) still required modified textures, 30 patients (40%) were eating

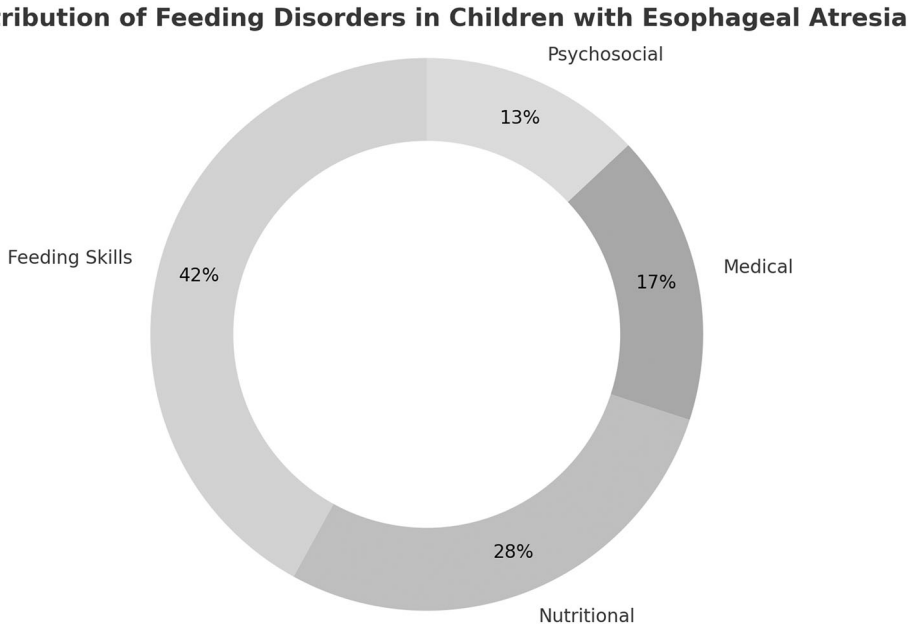

FIGURE 1 Pediatric feeding disorder types according to the World Health Organization consensus group definitions. Nutritional disorder—any case of malnutrition, specific nutrient deficiency or reliance upon oral supplements to sustain nutrition; Feeding skill dysfunction—use of modified feeding strategies, body position or special food texture; Medical disorder—any medical conditions that could interfere with normal age-appropriate eating practice, for example, aspirations, cardiorespiratory abnormality, anatomical malformations; Psychosocial dysfunction—any case of avoidance behaviors when being fed or inappropriate caregiver management of the child's feeding.

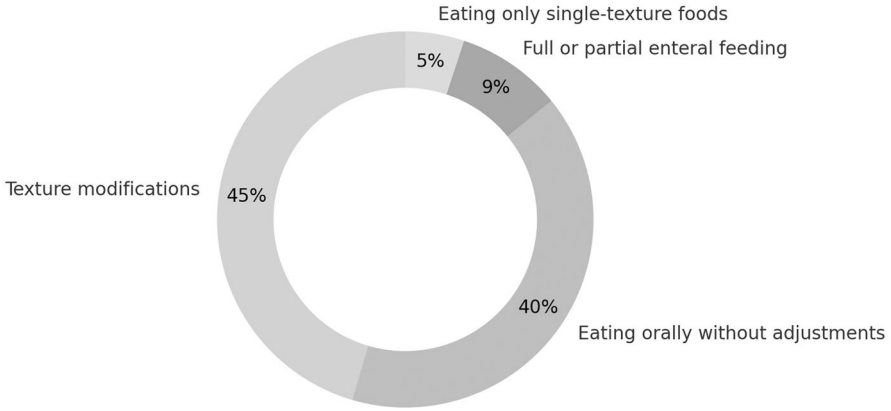

FIGURE 2 Current feeding status of pediatric patients with esophageal atresia/tracheoesophageal fistula.

orally with no need of adjustments, 7 patients (9%) needed full or partial enteral feeding, and 4 patients (5%) were eating only single-texture foods (Figure 2).

4 | DISCUSSION

This multicenter study used a parent-report approach and the recently proposed WHO-based consensus definition of PFD to provide insights into the prevalence and risk factors of PFD in children with EA/TEF. Our analysis revealed that 76% of children with EA/TEF met the criteria for PFD, with feeding skill dysfunction being the most common subtype. It emerged that these difficulties often began within the first few months of life and were associated with lower GA, lower birth weight, delayed initiation of oral feeding and increased need for esophageal dilations.

Our findings align with previous reports by suggesting that FD are common in children with EA/TEF, although the reported prevalence estimates vary considerably depending upon study design and diagnostic criteria.[15–18] One prospective study from Sweden reported FD in 75% of EA children aged 2–7 years, with rates declining in older age groups.[15] Similarly, Schier et al. reported that 68% of EA children experienced FD that included regurgitation, vomiting and food refusal, with a high incidence of food impaction.[16] In contrast, a Norwegian prospective cohort study found a lower prevalence, with parent-reported FD present in approximately one-third of children with EA.[17] These variations may stem from inconsistent definitions across studies. By applying the structured WHO-based definition of PFD, we were able to formulate more standardized characterization of feeding disorders in this population.

A key strength of our study is the classification of PFD subtypes. Feeding skill dysfunction was the most frequently reported subtype, encompassing issues such as the need for modified food textures and alterations in feeding strategies to contend with difficulties with chewing and swallowing. This aligns with earlier studies that noted that developmental feeding issues, including oral motor and sensory problems, are especially common in younger children with EA/TEF.[2] The predominance of this subtype underscores the importance of early referral to speech and language pathologists and occupational therapists, even in the absence of overt anatomic or medical complications. Our data also shows that children with PFD had significantly lower GA and birth weight than those without PFD. This is consistent with established literature linking prematurity and LBW to FD, most likely due to immature neurological and gastrointestinal development, poor suck-swallow coordination and prolonged hospitalizations.[19–21] These risks for PFD are compounded by structural anomalies and the need for surgical intervention in EA/TEF. Gunn-Charlton recently reported that infants with both prematurity and EA/TEF experience more complex clinical courses, including longer hospitalization, greater exposure to interventions and poorer neurodevelopmental outcomes, all of which may contribute to FD as well.[22]

An important finding of our study is the association between esophageal dilations and FD. Children with PFD underwent more frequent esophageal dilations compared to those without. In children with EA, esophageal dilation is most commonly performed for anastomotic strictures- a fibrotic narrowing at the anastomotic site that may result from ischemia, tension, or anastomotic leak following repair. These strictures occur in approximately 30%–50% of patients after EA repair.[23–26] The clinical indications for dilation

typically include persistent dysphagia, food impaction, recurrent regurgitation, or feeding refusal secondary to luminal narrowing observed on imaging or endoscopy. Various dilation modalities are used in this population, including balloon dilations, bougie dilators (Savary–Gilliard or Maloney types), or less commonly, fluoroscopically guided or endoscopic wire-assisted techniques.[24,25] Although these procedures are effective in restoring luminal patency, repeated sessions are often required, especially in children with long-gap EA, anastomotic leaks, or postoperative inflammation.

Beyond anatomical consequences, repeated instrumentation can itself exacerbate feeding dysfunction. Dilations are typically performed under general anesthesia, often accompanied by periprocedural fasting, discomfort, and transient odynophagia. Recurrent exposure to these procedures can contribute to oral hypersensitivity, anxiety during feeding, and conditioned aversion, particularly in infants and toddlers. Moreover, children who undergo multiple dilations are often placed on modified textures or prolonged enteral feeding during recovery, further delaying the acquisition of oral-motor skills.[26,27] In our cohort, the distribution of EA subtypes did not differ significantly between children with and without PFD. Nevertheless, anatomical complexity may indirectly contribute to feeding outcomes by increasing the risk of anastomotic complications and the need for repeated interventions. Long-gap EA and staged repairs, for instance, are known to have higher stricture rates and require more frequent dilations.[26,28] Because our data were collected through parent-reported questionnaires, we were unable to analyze the direct relationship between EA subtype and the number or type of dilations performed. Future studies integrating surgical characteristics, dilation techniques, and longitudinal feeding trajectories could help disentangle these interrelated factors and identify modifiable risk points for feeding dysfunction.

Delayed initiation of oral feeding was also associated with PFD. Although this may reflect the severity of the underlying condition or the presence of complications that preclude early oral intake,[29,30] it is also possible that delayed feeding itself contributes to skill deficits. The first months of life represent a critical window for the development of oral motor and sensory skills, and prolonged reliance on tube feeding can impair these processes.[11,31] Several studies have shown that children who begin oral feeding earlier, even through sham feeding protocols, may develop better swallowing function and have a smoother transition to age-appropriate feeding.[12,32] Moreover, the median age for introducing solid foods in our study cohort was 8 months, which is later than the current international guidelines recommendation of 6 months.[33] Delayed exposure to lumpy or textured solids has been associated with increased FD and picky eating in later childhood.[34] Parental anxiety around feeding and concerns about aspiration may contribute to overly cautious approaches to food introduction in children with congenital anomalies, such as EA/TEF,[35] further reinforcing the need for structured professional support and guidance.

In spite of multidisciplinary care having been shown to improve detection of comorbidities and feeding complications in EA/TEF,[13] European data showed that fewer than 60% of centers follow formal transition pathways.[36] In the present study, we demonstrated only about one-half of the children received regular care from dietitians or speech therapists during the first 6 months of life or prior to the introduction of complementary foods. Evidence-based benchmarks for the timing, frequency, and structure of multidisciplinary follow-up in EA/TEF are not yet well defined. However, several consensus-based recommendations advocating early, coordinated involvement of surgery, gastroenterology, nutrition, speech-language pathology, and psychology.[36–38] These guidelines emphasize structured follow-up during infancy, preschool, and school age, as well as transition to adult care. Interestingly, in the present study, we demonstrated that FD were less common among children who underwent surgery within the past 7 years compared with those operated on earlier. This finding may suggest gradual improvement in postoperative follow-up and early multidisciplinary intervention over time. However, prospective, multicenter studies with detailed registries that systematically capture the type, intensity, and structure of long-term multidisciplinary care are needed to better delineate its impact on feeding outcome.

This is one of the first multicenter studies to provide clinically based evidence for the association and related factors of PFD in children with EA/TEF according to the recent consensus WHO-based definition. This observational multicenter study has several limitations. First, the use of parent-reported questionnaires introduces potential recall bias and subjective interpretation. However, this limitation was mitigated by using a validated instrument (the MCH Feeding Scale) and by multidisciplinary classification of PFD based on detailed parental reports. In addition, the questionnaire response rate was approximately 80%, suggesting that we obtained a relatively broad representation of participants from different geographical regions. Second, recruitment through social media support groups may have introduced self-selection bias and potential overestimation of PFD prevalence, as families more engaged or concerned about feeding issues were likely to participate. Nevertheless, this approach enabled access to a geographically and institutionally diverse sample and aligns with previously published methodologies for rare disease and parent-based research

recruitment.[39,40] Importantly, such families often represent those actively seeking medical guidance, and their perspectives provide valuable insight into real-world care gaps and the need for structured multidisciplinary follow-up. Third, the relatively small sample size and unequal distribution between children with and without PFD may limit statistical power and the ability to perform robust subgroup analyses. Despite this, consistent trends across comparisons suggest that lower birth weight, prematurity, delayed oral feeding, and frequent esophageal dilations are interrelated risk factors for PFD development. Given the rarity of EA/TEF, this multicenter cohort represents one of the largest national datasets using standardized WHO-based criteria, offering valuable preliminary insights that warrant confirmation in larger, prospective studies.

5 | CONCLUSION

This study demonstrates that FD in children with EA/TEF are both common and complex, requiring a multidisciplinary approach for assessment and management. Many affected children do not receive adequate follow-up and intervention, highlighting the need for implementation of feeding evaluations as part of standard EA/TEF follow-up protocols, particularly for high-risk infants with lower GA and birth weight. Multidisciplinary feeding assessments should be integrated at key time points—during hospitalization, before discharge from the surgical unit, at the introduction of complementary foods and throughout early childhood. Importantly, before discharge from the surgical ward, parents should receive a concise information sheet outlining the expected feeding challenges, practical guidance on how to safely progress with food textures and key warning signs to monitor. Such proactive education may help reduce parental anxiety, promote confidence in feeding and support smoother transition to oral feeding at home. Routine evaluation by a speech therapist and dietitian should be embedded and the use of validated screening tools could facilitate early detection and referral. Integrating feeding assessments within national EA/TEF care pathways and transition programs may improve continuity of care and long-term outcomes. Future research should focus upon developing and validating EA-specific feeding interventions, targeting the distinct patterns of dysfunction identified in this population. Additionally, longitudinal studies that examine the evolution of FD over time would provide valuable insights into the natural history of these disorders and help optimize the timing of interventions.

CONFLICT OF INTEREST STATEMENT

The authors declare no conflicts of interest.

DATA AVAILABILITY STATEMENT

The datasets used and/or analyzed during the current study are available from the corresponding author on reasonable request.

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REFERENCES

1. Shaw-Smith C. Oesophageal atresia, tracheo-oesophageal fistula, and the VACTERL association: review of genetics and epidemiology. *J Med Genet*. 2006;43(7):545-554.
2. Maybee J, Deck J, Jensen E, Ruiz A, Kinder S, DeBoer E. Feeding and swallowing characteristics of children with esophageal atresia and tracheoesophageal fistula. *J Pediatr Gastroenterol Nutr*. 2023;1 76(3):288-294.
3. Mahoney L, Rosen R. Feeding problems and their underlying mechanisms in the esophageal atresia–tracheoesophageal fistula patient. *Front Pediatr*. 2017;5:127.
4. Rozensztrauch A, Śmigiel R, Błoch M, Patkowski D. The impact of congenital esophageal atresia on the family functioning. *J Pediatr Nurs*. 2020;50:e85-e90.
5. ten Kate CA, Rietman AB, van de Wijngaert Y, et al. Longitudinal health status and quality of life after esophageal atresia repair. *J Pediatr Gastroenterol Nutr*. 2021;73:695-702.
6. Kerzner B, Milano K, MacLean WC, Berall G, Stuart S, Chatoor I. A practical approach to classifying and managing feeding difficulties. *Pediatrics*. 2015;135(2):344-353.
7. Gustavsson E, Kölgran M, Jonsson M, Lamm K, Chmielewska A. Four-Fold increase of the number of children diagnosed with paediatric feeding disorder in Northern Sweden in 2012-2022. *Acta Paediatr (Stockholm)*. 2025;114(9):2238-2245.
8. Galai T, Friedman G, Moses M, et al. Demographic and clinical parameters are comparable across different types of pediatric feeding disorder. *Sci Rep*. 2022;12(1):8596.
9. Sharp WG, Berry RC, McCracken C, et al. Feeding problems and nutrient intake in children with autism spectrum disorders: a meta-analysis and comprehensive review of the literature. *J Autism Dev Disord*. 2013;43(9):2159-2173.
10. Goday PS, Huh SY, Silverman A, et al. Pediatric feeding disorder: consensus definition and conceptual framework. *J Pediatr Gastroenterol Nutr*. 2019;68(1):124-129.
11. Serel Arslan S, Demir N, Karaduman A, Tanyel F, Soyer T. Chewing function in children with repaired esophageal atresia-tracheoesophageal fistula. *Eur J Pediatr Surg*. 2018;28(6):534-538.
12. Soyer T, Arslan SS, Boybeyi Ö, Demir N, Tanyel FC. The role of oral feeding time and sham feeding on oropharyngeal swallowing functions in children with esophageal atresia. *Dysphagia*. 2023;38(1):247-252. doi:10.1007/s00455-022-10461-1
13. DeBoer EM, Prager JD, Ruiz AG, et al. Multidisciplinary care of children with repaired esophageal atresia and tracheoesophageal fistula. *Pediatr Pulmonol*. 2016;51(6):576-581.
14. Ramsay M, Martel C, Porporino M, Zygmuntowicz C. The montreal children's hospital feeding scale: a brief bilingual screening tool for identifying feeding problems. *Paediatr Child Health*. 2011;16(3):147-e17.
15. Ax SÖ, Abrahamsson K, Gatzinsky V, Jönsson L, Dellenmark-Blom M. Parent-reported feeding difficulties among children born with esophageal atresia: prevalence and early risk factors. *Eur J Pediatr Surg*. 2021;31(1):069-075.
16. Schier F, Korn S, Michel E. Experiences of a parent support group with the long-term consequences of esophageal atresia. *J Pediatr Surg*. 2001;36(4):605-610.

17. Birketvedt K, Mikkelsen A, Hanssen R, et al. Feeding difficulties, food intake, and growth in children with esophageal atresia. *JPGN Rep*. 2024;17 5(4):462-469.
18. Baird R, Levesque D, Birnbaum R, Ramsay M. A pilot investigation of feeding problems in children with esophageal atresia. *Dis Esophagus*. 2015;28(3):224-228.
19. Lau C. Development of infant oral feeding skills: what do we know? *Am J Clin Nutr*. 2016;103(2):616S-621SS. doi:10.3945/ajcn.115.109603
20. Johnson S, Matthews R, Draper ES, et al. Eating difficulties in children born late and moderately preterm at 2 y of age: a prospective population-based cohort study. *Am J Clin Nutr*. 2016;103(2):406-414.
21. Lau C, Sheena HR, Shulman RJ, Schanler RJ. Oral feeding in low birth weight infants. *J Pediatr*. 1997;130(4):561-569.
22. Gunn-Charlton JK. Impact of comorbid prematurity and congenital anomalies: a review. *Front Physiol*. 2022;1 13:880891.
23. Antoniou D, Soutis M, Christopoulos-Geroulanos G. Anastomotic strictures following esophageal atresia repair: a 20-year experience with endoscopic balloon dilatation. *J Pediatr Gastroenterol Nutr*. 2010;51(4):464-467.
24. Ko HK, Shin JH, Song HY, et al. Balloon dilation of anastomotic strictures secondary to surgical repair of esophageal atresia in a pediatric population: long-term results. *J Vasc Interv Radiol*. 2006;17(8):1327-1333.
25. Lisý J, Hetková M, Šnajdauf J, Vyhnánek M, Tůma S. Long-term outcomes of balloon dilation of esophageal strictures in children. *Acade Radiol*. 1998;5(12):832-835. doi:10.1016/s1076-6332(98)80243-2
26. Bevilacqua F, Ragni B, Conforti A, et al. Fixed the gap, solved the problem? eating skills in esophageal atresia patients at 3 years. *Dis Esophagus*. 2020;16 33(1):doz102.
27. Campos J, Tan Tanny SP, Kuyruk S, et al. The burden of esophageal dilatations following repair of esophageal atresia. *J Pediatr Surg*. 2020;55(11):2329-2334.
28. Van der Zee DC, Gallo G, Tytgat SHA. Thoracoscopic traction technique in long gap esophageal atresia: entering a new era. *Surg Endosc*. 2015;29(11):3324-3330.
29. Lees MC, Bratu I, Yaskina M, van Manen M. Oral feeding outcomes in infants with esophageal atresia and tracheoesophageal fistula. *J Pediatr Surg*. 2018;53(5):929-932.
30. Hew NLC, Grover Z, Paida S, et al. Predictors of poor outcomes in children with tracheoesophageal fistula/oesophageal atresia: an Australian experience. *World J Pediatr Surg*. 2021;4(2):e000190. doi:10.1136/wjps-2020-000190
31. Mason SJ, Harris G, Blissett J. Tube feeding in infancy: implications for the development of normal eating and drinking skills. *Dysphagia*. 2005;20(1):46-61.
32. Golonka NR, Hayashi AH. Early "sham" feeding of neonates promotes oral feeding after delayed primary repair of major congenital esophageal anomalies. *Am J Surg*. 2008;195(5):659-662.
33. Menzies J, Hughes J. Parental feeding concerns of infants and young children with oesophageal atresia. *J Paediatr Child Health*. 2020;56(11):1791-1794.
34. European Society for Paediatric Gastroenterology, Hepatology & Nutrition (ESPGHAN); European Academy of Paediatrics (EAP); European Society for Paediatric Research (ESPR); European Academy for Allergy and Clinical Immunology (EAACI); Federation of International Societies for Paediatric Gastroenterology, Hepatology & Nutrition (FISPGHAN); Latin American Society for Pediatric Gastroenterology, Hepatology & Nutrition (LASPGHAN); Pan Arab Society for Pediatric Gastroenterology and Nutrition (PASPGHAN); Asian Pan-Pacific Society for Pediatric Gastroenterology, Hepatology and Nutrition (AAPSGHAN); North American Society for Pediatric Gastroenterology, Hepatology and Nutrition (NASPGHAN); World Allergy Organization (WAO); Asia Pacific Academy of Pediatric Allergy, Respirology & Immunology (APAPARI). World Health Organization (WHO) guideline on the complementary feeding of infants and young children aged 6-23 months 2023: a multisociety response. *J Pediatr Gastroenterol Nutr*. 2024;79(1):181-188.
35. Northstone K, Emmett P, Nethersole F. The effect of age of introduction to lumpy solids on foods eaten and reported feeding difficulties at 6 and 15 months. *J Hum Nutr Diet*. 2001;14(1):43-54.
36. Durkin N, Pellegrini M, Gorter R, et al. ERNICA. Follow-up and transition practices in esophageal atresia: a review of European Reference Network on rare inherited and congenital anomalies (ERNICA) centres and affiliates. *Pediatr Surg Int*. 2024;940(1):300.
37. Dingemann C, Eaton S, Aksnes G, et al. ERNICA consensus conference on the management of patients with esophageal atresia and tracheoesophageal fistula: follow-up and framework. *Eur J Pediatr Surg*. 2020;30(6):475-482.
38. Krishnan U, Mousa H, Dall'Oglio L, et al. ESPGHAN-NASPGHAN guidelines for the evaluation and treatment of gastrointestinal and nutritional complications in children with esophageal atresia-tracheoesophageal fistula. *J Pediatr Gastroenterol Nutr*. 2016;63(5):550-570.
39. Hausmann JS, Vizcaino-Riveros J, Marin AC, et al. Feasibility and efficacy of online strategies to recruit parents of children with rheumatic diseases for research. *ACR Open Rheumatol*. 2022;4(5):410-416.
40. Sinclair M, McCullough JE, Elliott D, et al. Exploring research priorities of parents who have children with down syndrome, cleft lip with or without cleft palate, congenital heart defects, or spina bifida using ConnectEpeople: a social media coproduction research study. *J Med Internet Res*. 2019;21(11):e15847.

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