

Avoidant/Restrictive Food Intake Disorder in a Pediatric Obese Patient

Paolo A. Zegarra-Lizana ¹, Elizabeth J. Ramos- Orosco ^{2, 3}, Daniel Cisneros ¹, Efrain Flores ⁴

Review began 06/04/2024

Review ended 12/17/2024

Published 12/25/2024

© Copyright 2024

Zegarra-Lizana et al. This is an open access article distributed under the terms of the Creative Commons Attribution License CC-BY 4.0., which permits unrestricted use, distribution, and reproduction in any medium, provided the original author and source are credited.

DOI: 10.7759/cureus.76390

1. School of Medicine, Universidad Peruana de Ciencias Aplicadas, Lima, PER 2. Pediatrics, Nationwide Children's Hospital, Columbus, USA 3. Principles and Practice of Clinical Research, Executive and Continuing Education (ECPE) Harvard School of Public Health, Boston, USA 4. Pediatrics, Dr. Efrain Flores Pediatrics, Bolingbrook, USA

Corresponding author: Elizabeth J. Ramos- Orosco, elizabeth.ramos.orosco23@gmail.com

Abstract

Avoidant/restrictive food intake disorder (ARFID) can present with limited food variety, intake, or aversions. The symptoms can manifest at any age and typically appear in the first few years of life. The prevalence of ARFID varies widely among clinical and non-clinical populations, and its diagnosis requires trained health professionals to ensure early detection and prevention of poor outcomes.

A four-year-old boy developed an aversion to solid foods after a choking incident with chicken nuggets, fearing a recurrence. Pre-existing phobias and developmental delays compounded his selective eating. Despite a BMI percentile over the 99th percentile for his age (20.34 kg/m²), ARFID was diagnosed after a psychiatric referral, highlighting the intricate psychological aspect of pediatric feeding disorders.

Patients with ARFID may exhibit unexpected weight variations, and nutritional deficiencies do not always appear with low body weight. Child obesity is a pressing US public health issue, affecting 19.7%, potentially leading to psychiatric comorbidities such as depression or anxiety. Health professionals require training to detect and prevent adverse outcomes.

Understanding the mechanisms perpetuating ARFID and addressing mental health in this population are crucial aspects of daily practice.

Categories: Psychiatry, Pediatrics

Keywords: arfid, avoidant-restrictive food intake disorder, "childhood obesity morbidity", obesity counseling, obesity practice

Introduction

Since 2013, avoidant/restrictive food intake disorder (ARFID) has been identified as a psychiatric condition classified in the DSM-5. This disorder presents with abnormal eating behavior with persistent failure to meet appropriate energy or nutritional needs, not explained by other medical or non-medical conditions [1]. These odd eating habits may arise from an inability to tolerate specific sensory properties of food, such as texture or taste; unreasonable fear of the consequences of eating, such as vomiting or choking; and a general disinterest in food or eating [2].

The prevalence of ARFID is estimated to range from 5% to 14% [3], with a higher number of affected children between the ages of four and nine years, particularly males, and with a longer duration of illness compared to other eating disorders [4]. However, with heterogeneous data about the setting and sample characteristics, there is literature with values that go from below 1% in general population samples from European and Asian countries to up to 64% in a tertiary care pediatric feeding clinic and an estimated incidence from a national surveillance study of 2.02 per 1,00,000 children and adolescents in Canada. Common psychiatric comorbidities observed in children diagnosed with ARFID include anxiety disorders and autism spectrum disorder. Nonetheless, this group of patients seemed to be less prone to mood disorders than other eating disorders [5].

Based on nutritional deficiencies, patients may present with clinical signs such as fatigue, syncope, constipation, hair loss, abdominal pain, hypothermia, bradycardia, and paleness, among others [2]. Additionally, an impact on growth and bone development has been observed, reflected in reduced longitudinal growth, which is suspected to be related to deficiencies in proteins, zinc, calcium, vitamin D, and dairy intake [6].

The diagnosis of ARFID still needs to be completely clear, as there is no standardized approach, and it can be confused with other psychiatric disorders. Various assessments are used, such as the Eating Disturbances in Youth Questionnaire (EDY-Q) [7], DSM-5 criteria, and Stanford Feeding Questionnaire [8], among others. However, standardization is yet to be achieved. The symptoms associated with the diagnosis can be grouped to prepare for its management in three groups: limited variety, limited ingestion, and aversive [9].

How to cite this article

Zegarra-Lizana P A, Ramos Orosco E J, Cisneros D, et al. (December 25, 2024) Avoidant/Restrictive Food Intake Disorder in a Pediatric Obese Patient. Cureus 16(12): e76390. DOI 10.7759/cureus.76390

Here, we present a case of a four-year-old boy diagnosed with ARFID. We highlight some mechanisms involved in this condition, the importance of physical and mental health in this population, and the awareness of a not-so-common presentation of malnutrition that is increasing in frequency.

Case Presentation

This clinical case involves a four-year-old boy who presented with an onset of four months of poor appetite for solid foods following a choking incident with chicken nuggets. The episode, which required a Heimlich maneuver by the mother, resulted in the child's reluctance to consume solids and a preference for liquids only during the following two weeks, prompting the parents to resort to a diet of liquefied foods. This group included commercial nutritional supplements such as four bottles of milk per day that the family reduced to eight ounces daily, shakes, jello, and blended bananas. The patient exhibited fear of choking, compounded by pre-existing phobias related to hair cutting and insects. This aversion to solid foods raised concerns about potential nutritional deficiencies, so the parents scheduled a visit to the pediatrician.

About his past medical history, he was born by spontaneous vaginal delivery without any complications during pregnancy. The child also had a medical history of developmental and speech delay, as well as aggressive behavior, for which therapeutic interventions around two years old included physical therapy, occupational therapy, and speech therapy. In addition, he had a neuropsychological evaluation done at three years old. However, they could not confirm autism spectrum disorder (ASD) nor attention deficit hyperactivity disorder (ADHD), and they recommended he return at age five.

Physical examination yielded unremarkable vital signs with a BMI of 20.34 kg/m² (above the 99th percentile), while an X-ray of the neck revealed a clear airway with no foreign bodies. In addition, his laboratory results showed in-range folate and vitamin B12 levels (23.1 ng/ml and 1820 pg/ml, respectively) and slightly decreased vitamin D levels (25 ng/ml). Normal values: 30 to 100 ng/ml.

A referral to psychiatry was made, leading to the diagnosis of avoidant/restrictive food intake disorder. The specialist scheduled an appointment with the neuropsychologist and clinical psychologist and a follow-up with his primary care pediatrician in six weeks. During a follow-up visit at around five years old, the patient started psychotherapy at Lurie's Hospital, and at that time, the mother had to schedule a neuropsychological evaluation. He started eating better and received support from school and his speech therapist.

The graphs present the changes in weight over time. In Figure 1, the weight per age percentile measures showed a peak of overweight around six months old that started falling to typical values until the first year. After that, the patient's weight increased again, reaching values near the upper percentiles. In the last months of his second year, those values oscillated between overweight and obesity.

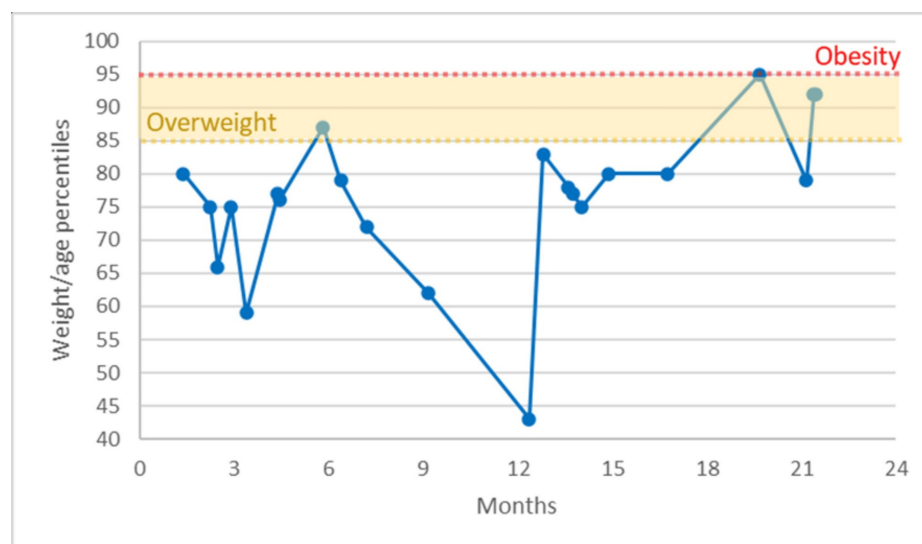


FIGURE 1: WHO weight-for-age percentiles in the first two years

WHO: World Health Organization

After two years of age, the BMI per age percentiles of the patient showed in the graph of Figure 2 that the patient continued the trend from overweight to finally reaching the obesity category at 31 months of age. However, there are some ups and downs in this range of percentiles. The highest peak occurred when the patient was 46 months old, and after that, followed an important down to the 97th percentile. After the first

visit with his pediatrician at 53 months, the trend started to repeat until another peak at around 60 months. At that time, the patient visited psychiatry, and the values of BMI/age stopped growing and did not surpass the previous marks until the last visit reported at 63 months.

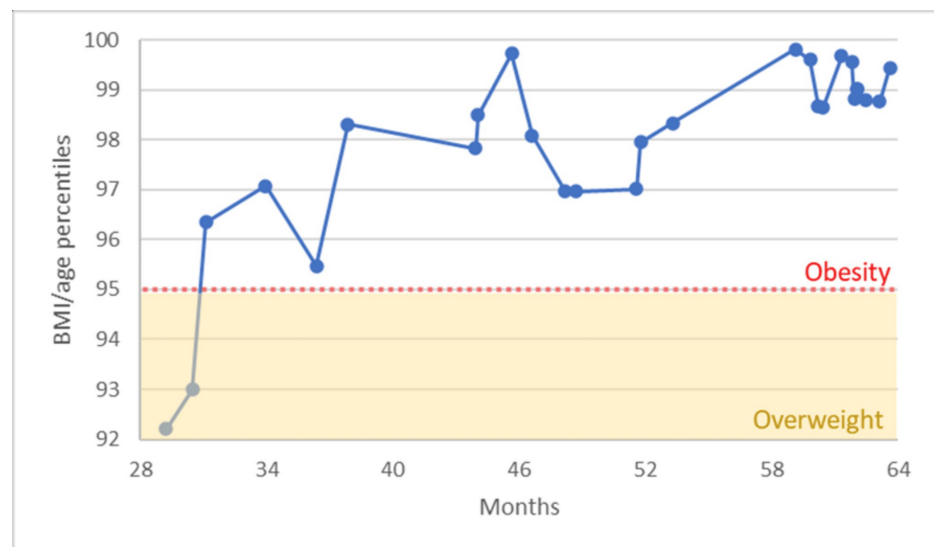


FIGURE 2: CDC extended BMI for age percentiles (2 to 6years)

CDC: Centers for Disease Control and Prevention, BMI: Body Mass Index.

Discussion

In this case, the patient presentation is similar, as expected, to the literature reviewed with a four-year-old boy with a history of phobias and aggressive behavior. As reviewed by Sanchez-Cerezo et al., this condition is more common in young males with usual psychiatric comorbidities such as ADHD, ASD, or anxiety disorders [5,10,11]. The only confirmed condition in this patient was his specific phobias to hair cutting and insects. However, health professionals should be aware of some aspects of the disease.

ARFID is a disorder that, since its definition, has helped to elucidate different strategies to manage some presentations related to food ingestion in children. The aversive presentation for the diagnosis usually comes after a traumatic event that is afraid of being repeated, not necessarily associated with feeding. Alongside some anxiety-related features and hypersensitivity to corporal sensations, the initial fear led to overestimating the probability that this event would repeat in time or with different kinds of food. In severe cases, all the solids can be limited, and only soft or liquid food can be consumed. Another interesting feature of this group is that it can present during any moment of life, compared with the groups of limited variety and limited ingestion of ARFID, which are more likely to appear during the first years [9,12,13]. In this case, the patient had more symptoms of a severe clinical presentation of aversive ARFID without tolerance for solid foods.

The expected body mass of patients with ARFID is typically underweight, although milder cases can be diagnosed without such a pronounced change. Yule S et al. studied nutritional deficiencies in ARFID associated with ASD, observing that these deficiencies did not always correlate with low body weight. 14.3% of 35 patients were overweight or obese, with normal-range weight values in most of the rest [14]. This case report places the patient in the obesity category based on their BMI for age with persistence since he was two years old (Figure 1), reflecting a growing trend in the country.

Child obesity is one of the biggest concerns in public health in the United States. The prevalence between the ages of two and 19 is approximately 19.7%, representing nearly 14.7 million children and adolescents. Despite a lower prevalence in the early ages of 2-5 years (12.7%), as a chronic condition without management, the consequences in the world would add up [15]. In 2022, Ling J et al. studied the worldwide economic burden of overweight and obesity in children compared to those with normal weight. They found an increased annual total medical cost of up to \$237.55 per capita attributable to high weight, with the annual direct and indirect costs projected to be \$13.62 billion and \$49.02 billion by 2050 [16]. One of those indirect costs may lean upon psychiatric comorbidities, which are higher in this group of patients, as pointed out by Wen-Wang Rao et al. They found that obese children and adolescents have more risk for major depressive disorder in comparison to healthy controls, like the increased prevalence of depressive and anxiety symptoms described by Wang S et al. in China [17,18]. Therefore, mental health in this population should also be an object of screening in daily practice.

Also, patients with malnutrition frequently have micronutrient deficiency, which limits children from reaching their full potential in cognitive and intellectual abilities, especially with nonverbal reasoning and logical problem resolution [19]. Therefore, Tam E et al. described in their study that some diseases directly involve micronutrients. Multiple interventions with micronutrients can reduce anemia, lipid-based nutrient supplementation (LNS) can reverse stunting and underweight, vitamin A can reduce general mortality, and zinc decreases diarrhea incidence [20]. This mineral supplementation in premature babies also helped to reduce mortality and stimulate early growth [21].

In mental health, Głowska D et al. describe vitamin D as a major player in several conditions; therefore, they recommend maintaining average blood values to prevent or alleviate those diseases [22]. This patient presented low in vitamin D; as the previous study suggests; either the vitamin D deficiency or his aggressive behavior and suspicion of ASD could have influenced the other. Adequate supplementation might be beneficial in this case, and physicians should keep it in mind during the holistic evaluation of patients with ARFID.

Additionally, the mechanism to perpetuate its condition seemed similar to people without the ARFID diagnosis, as studied by Kerem et al. The reward surfeit theory of overeating postulates that an increase in the reward response of regions in the brain can lead to excess consumption of high-calorie food without a homeostatic need. Furthermore, human functional magnetic resonance imaging (fMRI) studies in people who were overweight/obese showed hyperactivation of a neurologic circuit of food motivation in response to some appetizing food. These areas include the insula, orbitofrontal cortex (OFC), and nucleus accumbens. Kerem et al. found that in patients with ARFID and obesity, the OFC area was more activated in response to subjective hunger than in ARFID patients with normal weight [23]. Therefore, the ingestion behavior of ARFID among these patients can potentially increase the metabolic consequences of adiposity in the patient reported, which predisposes them to maintain obesity and include him in a more vulnerable population.

There is insufficient scientific evidence to establish the definitive management of this syndrome, but most publications agree on a multidisciplinary approach. Bialek-Dratwa A. et al. describe methods such as food chaining, family-based treatment, cognitive-behavioral therapy (CBT), or feeling and body investigators [24]. Their review focuses more on the behavioral and nutritional approaches, where understanding the patient is key for the therapeutic process. Del Toro V et al. also highlights the role of the mental health specialist for most cases, suggesting the same multidisciplinary approach for the more severe cases denoted by red flags and signs of impaired oral development [9]. Both studies did not suggest pharmacological management for this condition and agreed that further clinical studies should be done to clarify more of the therapy.

Therefore, psychotherapy plays an essential role in the management of ARFID, with a particular incidence of CBT among the many alternatives. Wilmott E et al. reviewed all the currently used therapies for this diagnosis. These included behavioral approaches, CBT, family-based therapy, and a combination of these across life spans and clinical environments. As with other management decisions, the best one for each patient should consider its demography, trigger and maintaining factors of ARFID, comorbidities, etcetera [25]. For example, in those under age 21, the family therapy interventions were more applied. In this patient, the behavioral approach in his group is one of the most used for those under age 15, especially with escape extinction techniques in younger children. This is part of the CBT approach and improves sensorial sensibility, the fear of adverse consequences, and all the other benefits of losing interest/appetite from the other therapy components [26]. Therefore, it would be an excellent option for the patient to follow, as it would target the particular type of ARFID in this case. However, we should hope for the best for the patient's care among his available options to continue the treatment for the appropriate age group.

In this case, the management included a multidisciplinary approach with the participation of the pediatrician, neuropsychologist, clinical psychologist, occupational therapist, and speech therapist, without using any psychotropic drugs for the patient. Figure 2 shows that it stopped the upward trend of weight gain from previous years. Based on the gathered literature, this approach is according to the current general management for this diagnosis.

Conclusions

This case highlights a complex and atypical presentation of ARFID in a four-year-old boy with severe aversive eating behaviors, specific phobias, and obesity. Although ARFID is often associated with underweight or malnourished patients, this patient demonstrates how selective food avoidance can contribute to weight gain, emphasizing the importance of recognizing diverse clinical presentations. The successful stabilization of the patient's weight trajectory reinforces the value of a multidisciplinary, non-pharmacological approach.

The intersection of ARFID, psychiatric comorbidities, and atypical nutritional patterns underscores the need for early identification and intervention. Understanding the mechanisms perpetuating ARFID and addressing mental health in this population is crucial for improving the quality of life of these patients. Therefore, we encourage further research to detect this condition early, even in atypical presentations.

Additional Information

Author Contributions

All authors have reviewed the final version to be published and agreed to be accountable for all aspects of the work.

Concept and design: Elizabeth J. Ramos- Orosco, Paolo A. Zegarra-Lizana, Daniel Cisneros, Efrain Flores

Acquisition, analysis, or interpretation of data: Elizabeth J. Ramos- Orosco, Paolo A. Zegarra-Lizana, Daniel Cisneros, Efrain Flores

Drafting of the manuscript: Elizabeth J. Ramos- Orosco, Paolo A. Zegarra-Lizana, Daniel Cisneros, Efrain Flores

Critical review of the manuscript for important intellectual content: Elizabeth J. Ramos- Orosco, Paolo A. Zegarra-Lizana, Daniel Cisneros, Efrain Flores

Supervision: Elizabeth J. Ramos- Orosco, Efrain Flores

Disclosures

Human subjects: Consent for treatment and open access publication was obtained or waived by all participants in this study. **Conflicts of interest:** In compliance with the ICMJE uniform disclosure form, all authors declare the following: **Payment/services info:** All authors have declared that no financial support was received from any organization for the submitted work. **Financial relationships:** All authors have declared that they have no financial relationships at present or within the previous three years with any organizations that might have an interest in the submitted work. **Other relationships:** All authors have declared that there are no other relationships or activities that could appear to have influenced the submitted work.

References

1. Katzman DK, Norris ML, Zucker N: Avoidant restrictive food intake disorder . *Psychiatr Clin North Am*. 2019, 42:45-57. [10.1016/j.psc.2018.10.003](https://doi.org/10.1016/j.psc.2018.10.003)
2. Brigham KS, Manzo LD, Eddy KT, Thomas JJ: Evaluation and treatment of avoidant/restrictive food intake disorder (ARFID) in adolescents. *Curr Pediatr Rep*. 2018, 6:107-13. [10.1007/s40124-018-0162-y](https://doi.org/10.1007/s40124-018-0162-y)
3. Feillet F, Bocquet A, Briand A, et al.: Nutritional risks of ARFID (avoidant restrictive food intake disorders) and related behavior. *Arch Pediatr*. 2019, 26:437-41. [10.1016/j.arcped.2019.08.005](https://doi.org/10.1016/j.arcped.2019.08.005)
4. Farag F, Sims A, Strudwick K, et al.: Avoidant/restrictive food intake disorder and autism spectrum disorder: clinical implications for assessment and management. *Dev Med Child Neurol*. 2022, 64:176-82. [10.1111/dmcn.14977](https://doi.org/10.1111/dmcn.14977)
5. Sanchez-Cerezo J, Nagaraj L, Gledhill J, Nicholls D: What do we know about the epidemiology of avoidant/restrictive food intake disorder in children and adolescents? A systematic review of the literature. *Eur Eat Disord Rev*. 2023, 31:226-46. [10.1002/erv.2964](https://doi.org/10.1002/erv.2964)
6. Proctor KB, Rodrick E, Belcher S, Sharp WG, Kindler JM: Bone health in avoidant/restrictive food intake disorder: a narrative review. *J Eat Disord*. 2023, 11:44. [10.1186/s40337-023-00766-3](https://doi.org/10.1186/s40337-023-00766-3)
7. Kurz S, van Dyck Z, Dremmel D, Munsch S, Hilbert A: Early-onset restrictive eating disturbances in primary school boys and girls. *Eur Child Adolesc Psychiatry*. 2015, 24:779-85. [10.1007/s00787-014-0622-z](https://doi.org/10.1007/s00787-014-0622-z)
8. Iron-Segev S, Best D, Arad-Rubinstein S, Efron M, Serur Y, Dickstein H, Stein D: Feeding, eating, and emotional disturbances in children with avoidant/restrictive food intake disorder (ARFID). *Nutrients*. 2020, 12:10.3390/nu12113385
9. De Toro V, Aedo K, Urrejola P: Avoidant/restrictive food intake disorder (ARFID): What the pediatrician should know. *Andes Pediatr*. 2021, 92:298-307. [10.32641/andespediatr.v92i2.2794](https://doi.org/10.32641/andespediatr.v92i2.2794)
10. Bourne L, Mandy W, Bryant-Waugh R: Avoidant/restrictive food intake disorder and severe food selectivity in children and young people with autism: A scoping review. *Dev Med Child Neurol*. 2022, 64:691-700. [10.1111/dmcn.15139](https://doi.org/10.1111/dmcn.15139)
11. Bourne L, Bryant-Waugh R, Cook J, et al.: Avoidant/restrictive food intake disorder: A systematic scoping review of the current literature. *Psychiatry Res*. 2020, 288:112961. [10.1016/j.psychres.2020.112961](https://doi.org/10.1016/j.psychres.2020.112961)
12. Dolman L, Thornley S, Doxtator K, et al.: Multimodal therapy for rigid, persistent avoidant/restrictive food intake disorder (ARFID) since infancy: A case report. *Clin Child Psychol Psychiatry*. 2021, 26:451-63. [10.1177/1359104520981401](https://doi.org/10.1177/1359104520981401)
13. Rienecke RD, Drayton A, Richmond RL, Mammel KA: Adapting treatment in an eating disorder program to meet the needs of patients with ARFID: Three case reports. *Clin Child Psychol Psychiatry*. 2020, 25:293-303. [10.1177/1359104519864129](https://doi.org/10.1177/1359104519864129)
14. Yule S, Wanik J, Holm EM, et al.: Nutritional deficiency disease secondary to ARFID symptoms associated with autism and the broad autism phenotype: a qualitative systematic review of case reports and case series. *J Acad Nutr Diet*. 2021, 121:467-92. [10.1016/j.jand.2020.10.017](https://doi.org/10.1016/j.jand.2020.10.017)
15. Centers for Disease Control and Prevention: Childhood obesity facts . (2022). Accessed: May 17, 2023: <https://www.cdc.gov/obesity/data/childhood.html>.
16. Ling J, Chen S, Zahry NR, Kao TA: Economic burden of childhood overweight and obesity: A systematic review and meta-analysis. *Obes Rev*. 2023, 24:e13535. [10.1111/obr.13535](https://doi.org/10.1111/obr.13535)

17. Rao WW, Zong QQ, Zhang JW, et al.: Obesity increases the risk of depression in children and adolescents: Results from a systematic review and meta-analysis. *J Affect Disord.* 2020, 267:78-85. [10.1016/j.jad.2020.01.154](https://doi.org/10.1016/j.jad.2020.01.154)
18. Wang S, Sun Q, Zhai L, Bai Y, Wei W, Jia L: The prevalence of depression and anxiety symptoms among overweight/obese and non-overweight/non-obese children/adolescents in China: a systematic review and meta-analysis. *Int J Environ Res Public Health.* 2019, 16: [10.3390/ijerph16030340](https://doi.org/10.3390/ijerph16030340)
19. Lam LF, Lawlis TR: Feeding the brain - The effects of micronutrient interventions on cognitive performance among school-aged children: A systematic review of randomized controlled trials. *Clin Nutr.* 2017, 36:1007-14. [10.1016/j.clnu.2016.06.013](https://doi.org/10.1016/j.clnu.2016.06.013)
20. Tam E, Keats EC, Rind F, Das JK, Bhutta AZ: Micronutrient supplementation and fortification interventions on health and development outcomes among children under-five in low- and middle-income countries: a systematic review and meta-analysis. *Nutrients.* 2020, 12: [10.3390/nu12020289](https://doi.org/10.3390/nu12020289)
21. Staub E, Evers K, Askie LM: Enteral zinc supplementation for prevention of morbidity and mortality in preterm neonates. *Cochrane Database Syst Rev.* 2021, 3:CD012797. [10.1002/14651858.CD012797.pub2](https://doi.org/10.1002/14651858.CD012797.pub2)
22. Głowska D, Kołota A, Lachowicz K, Skolmowska D, Stachoń M, Guzek D: The influence of vitamin D intake and status on mental health in children: a systematic review. *Nutrients.* 2021, 13: [10.3390/nu13030952](https://doi.org/10.3390/nu13030952)
23. Kerem L, Van De Water AL, Kuhnle MC, et al.: Neurobiology of avoidant/restrictive food intake disorder in youth with overweight/obesity versus healthy weight. *J Clin Child Adolesc Psychol.* 2022, 51:701-14. [10.1080/15374416.2021.1894944](https://doi.org/10.1080/15374416.2021.1894944)
24. Białek-Dratwa A, Szymańska D, Grajek M, Krupa-Kotara K, Szczepańska E, Kowalski O: ARFID-strategies for dietary management in children. *Nutrients.* 2022, 14: [10.3390/nu14091739](https://doi.org/10.3390/nu14091739)
25. Willmott E, Dickinson R, Hall C, et al.: A scoping review of psychological interventions and outcomes for avoidant and restrictive food intake disorder (ARFID). *Int J Eat Disord.* 2024, 57:27-61. [10.1002/eat.24073](https://doi.org/10.1002/eat.24073)
26. Burton-Murray H, Becker KR, Breithaupt L, et al.: Cognitive-behavioral therapy for avoidant/restrictive food intake disorder: A proof-of-concept for mechanisms of change and target engagement. *Int J Eat Disord.* 2024, 57:1260-7. [10.1002/eat.24126](https://doi.org/10.1002/eat.24126)