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Medical Management of Restrictive Eating Disorders in Adolescents and Young Adults:

The Society for Adolescent Health and Medicine

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Abstract

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The medical provider plays an important role in the management of adolescents and young adults (AYAs) with restrictive eating disorders (EDs), including anorexia nervosa (AN), atypical anorexia nervosa, and avoidant/restrictive food intake disorder. The focus of this article is the medical management of AYAs with restrictive EDs, which can be performed by a number of different medical providers, including pediatricians, family physicians, internists, nurse practitioners, and, in some countries, psychiatrists. This position paper clarifies the role of the medical provider in diagnosing and managing restrictive EDs in AYAs and advocates for consistent standardized terminology for clinical and research purposes when describing the degree of malnutrition and differentiating the degree of malnutrition from treatment goal weight. Boys and men with restrictive EDs are frequently underdiagnosed and may have distinct clinical presentations with important implications for medical management. The medical and psychological complications of AYAs with avoidant/restrictive food intake disorder and atypical anorexia nervosa can be just as severe as those with AN. Scientific evidence supports weight restoration as an important early goal of treatment in AN. Most AYAs with restrictive EDs can be treated as outpatients, and family-based therapy is a first-line outpatient psychological treatment for adolescents with AN. Recent research has demonstrated that inpatient refeeding protocols can start with higher caloric content and advance more rapidly than previously recommended.

Positions of the Society for Adolescent Health and Medicine

1. Medical providers, as members of multidisciplinary teams, play a critical role in diagnosing and managing restrictive eating disorders (EDs) in adolescent and young adults (AYAs) (Grade IV C).
2. Consistent standardized terminology and methodology for determination of severity of malnutrition is recommended for clinical and research purposes. Use of % median body mass index (%mBMI), BMI Z-scores, and amount and rate of weight loss are recommended (Grade IV C).
3. Weight restoration is an important early goal of treatment (Grade III B). It is important to individualize treatment goal weight (TGW) with consideration of premorbid trajectories for height, weight, and BMI; age at pubertal onset; and current sexual maturity. In individuals assigned female sex at birth, resumption of spontaneous menses can help guide achievement of TGW.
4. Boys and men with restrictive EDs are underdiagnosed and often have distinct clinical presentations with significant implications for medical management (Grade IV C).
5. The medical and psychological complications of AYAs with avoidant/restrictive food intake disorder (ARFID) and atypical anorexia nervosa (AAN) can be as severe as those with anorexia nervosa (AN) (Grade IIaB).
6. Most AYAs with restrictive EDs can be managed as outpatients. Family-based therapy (FBT) is a first-line outpatient psychological treatment for adolescents with AN (Grade 1A).

7. Inpatient refeeding protocols for AYAs with AN can include higher caloric content and increase more rapidly than the historical standard of care, which commenced with lower calories and advanced slowly (Grade IA).

8. Restrictive EDs can affect AYAs of diverse genders, races, ethnicities, sexual orientations, socio-economic backgrounds, and weights (Grade III B).

9. More research, including multicenter studies and prospective registries, is needed to inform the assessment, medical management and outcomes of restrictive EDs, including in diverse populations (Grade IV C).

Statement of the Problem

EDs are serious conditions with significant medical sequelae and high mortality. Onset is usually during adolescence or young adulthood. AYAs with EDs are best managed by a multidisciplinary team, with the medical provider an essential member. Medical providers should be aware of the changing epidemiology of EDs, diagnostic criteria, and advances in psychological, nutritional and medical interventions.

Diagnostic criteria in the Diagnostic and Statistical Manual of Mental Disorders, fifth edition (DSM-5) include new categories of restrictive EDs such as AAN and ARFID [1]. The Society for Adolescent Health and Medicine (SAHM) recognizes that restrictive EDs may result in significant morbidity and mortality and that it is critical to address the medical, nutritional, and psychological needs of AYAs with these disorders and support their families. SAHM proposes the following positions and recommendations. Where available, positions are evidence-based, and the quality and strength of the evidence are rated using the 2014 National Institute for Health and Care Excellence Guidelines rating system from the United Kingdom [2].

Methods

A MEDLINE search was conducted for articles published between 1990 and 2021 on EDs in AYAs. Table 1 lists the search keywords, hierarchy of evidence, and grading scheme.

Positions and Recommendations

Position 1: Medical providers, as members of multidisciplinary teams, play a critical role in diagnosing and managing restrictive EDs in AYAs (Grade IV C)

AYAs with restrictive EDs often first present to medical providers, whose role in early identification and management is crucial. Timely intervention can result in shorter duration of illness with improved outcome [3]. Initial evaluation involves diagnosis; exclusion of other causes of weight loss or vomiting; nutritional and psychosocial assessment; determination of severity of malnutrition; and evaluation of medical complications and comorbidities. Medical providers should be able to identify the spectrum of EDs and distinguish them from other physical and mental health disorders that can present with similar symptoms; recognize disordered eating behaviors (including dieting, fasting, excessive exercising, bingeing, vomiting, and using laxatives, diuretics, and over-the-counter

or prescription “diet” pills); and detect changes in weight (weight loss, fluctuations, or failure to gain weight during a growth period), growth delay, and interruption of sexual development. Once a diagnosis is made, medical providers help establish a multidisciplinary team, determine the appropriate level of care, and manage acute and chronic medical complications. Medical providers should regularly monitor health status at each level of care (inpatient, residential treatment, outpatient, partial hospitalization/day treatment, and intensive outpatient programs) and coordinate care with mental health and other providers.

Recommendations

1. Medical providers should be able to recognize and diagnose the spectrum of restrictive EDs in AYAs.
2. Medical providers should monitor the health status of AYAs with restrictive EDs at each level of care. The frequency of monitoring will depend on the AYA’s clinical presentation throughout each level of care.

Position 2: Consistent standardized terminology and methodology for determination of severity of malnutrition is recommended for clinical and research purposes. Use of % median body mass index (% mBMI), BMI Z-scores, and amount and rate of weight loss are recommended (Grade IV C)

Restrictive eating behaviors contribute to weight loss and malnutrition, which can be assessed by presentation weight as well as the degree and rapidity of weight loss. The literature is replete with confusion about the meaning and determination of terms such as Ideal, Expected, Standard, or Median Body Weight (IBW, EBW, SBW, and MBW, respectively), often used interchangeably. Different methodologies to determine IBW and EBW (i.e., weight-for-stature vs. % mBMI) can give widely divergent results, particularly at the extremes of height [4].

Growth charts remain an important tool in allowing for early detection of restrictive EDs in AYA. Canada and other countries outside the United States use growth charts from the World Health Organization to monitor growth [5]. In the United States, the Centers for Disease Control and Prevention and the American Society for Parenteral and Enteral Nutrition [6] recommend using the 2000 Centers for Disease Control and Prevention growth charts (www.cdc.gov/growthcharts) for those aged 2–20 years. These charts provide graphs and tables of weight-for-age, height-for-age, and BMI-for-age but not weight-for-height and age; %mBMI can be calculated (current BMI/50th percentile BMI for age and sex × 100) to compare the patient’s BMI to the reference population (Table 2). Although MBW can be obtained from the weight-for-age charts (50th percentile weight for age and sex), it does not take height into account. BMI percentiles, while helpful in determining whether someone is within the normal range, do not describe how far an individual’s BMI deviates from the norm and are less useful at the extremes (e.g., below the third percentile). An international survey proposed using BMI Z-scores to assess the degree of deviation from the median, categorizing the degree of malnutrition into mild, moderate, or severe categories [7]. The American Academy of Pediatrics, American Society for Parenteral and Enteral Nutrition, and Academy of Nutrition and Dietetics propose using a combination of %mBMI, Z-scores, and % weight loss in pediatrics [6,8,9], with additional classifications

by rate of weight loss in adults [10]. Clinicians should calculate the magnitude of weight loss if more than one data point is available and rate of weight loss if time frame is available. The amount of weight loss is calculated as a percentage of body mass lost ([usual weight minus presentation weight] divided by usual weight). The rate of weight loss is calculated by dividing the amount by the number of months over which weight loss occurred (percentage of body weight lost divided by months). Current guidance determines the degree of malnutrition by rate using increments of 1, 3, 6, and 12 months. Patients may have moderate or severe malnutrition by these metrics despite normal BMI at presentation. Increasing proportions of AYAs have AAN [11] and may be of normal weight but can have life-threatening complications, especially after rapid weight loss [12]. This highlights the need for standardization of terminology and methodology around the assessment of malnutrition severity for clinical and research purposes. Table 3 outlines a suggested adaptation of existing classifications for use in AYAs with EDs, considering the degree of deviation from the norm and both the amount and rate of weight loss.

Recommendations

1. Terms such as IBW, EBW, SBW, and MBW should be avoided.
2. Use of %mBMI, BMI Z-scores, and amount and rate of weight loss are recommended to classify a patient with mild, moderate, or severe malnutrition.

Position 3: Weight restoration is an important early goal of treatment (Grade III B). It is important to individualize treatment goal weight (TGW) with consideration of premorbid trajectories for height, weight and BMI; age at pubertal onset; and current sexual maturity. In individuals assigned female sex at birth, resumption of spontaneous menses can help guide achievement of TGW

TGW is the weight necessary to support normal growth and development, including puberty (return of menstrual function in individuals assigned female), sex at birth, physical activity, and psychological and social functioning [13]. Determining an individual's TGW should consider premorbid trajectory for height, weight, and BMI; age at pubertal onset; current sexual maturity rating; as well as parental heights. Determination of TGW is particularly challenging in transgender AYA. TGW should be individualized and is not necessarily the same as the weight associated with mBMI. Some medical providers recommend a TGW range instead of a single TGW. The patient and caregivers should be encouraged to focus on the mid-end or higher end of the range in an effort to promote complete recovery.

Recommendations

1. Determination of TGW for an individual should be based on previous height, weight and BMI percentiles, pubertal stage, and growth trajectory (Grade IV C).
2. During a period of growth, TGW should be reassessed every 3–6 months (Grade IV C).

Position 4: Boys and men with restrictive EDs are underdiagnosed and often have distinct clinical presentations with significant implications for medical management (Grade IV C)

Most ED research has been conducted in girls/women, resulting in underdiagnosed and underrecognized EDs in boys/men [14]. Diagnostic criteria may not capture the full spectrum of ED symptoms in boys/men, and medical providers report feeling less comfortable managing EDs in boys/men [14]. Boys/men with EDs may experience stigma, perceive gender bias in ED treatment settings, and are less likely to seek treatment for EDs than girls/women [14].

The male body ideal is characterized by lean muscularity, which may lead to distinct ED presentations, including excessive exercise, use of appearance- and performance-enhancing substances, and muscularity-oriented eating (e.g., protein over-consumption while restricting carbohydrates) [14]. In general, adolescent boys have greater energy requirements than adolescent girls, but many refeeding protocols are not gender specific [15]. A limited but growing literature has examined medical complications of restrictive EDs in boys/men, noting significant consequences in several organ systems [14]. Suppression of reproductive hormones can be associated with bone deficits and increased fracture risk in boys/men, similar to girls/women [16,17].

Recommendations

1. Medical providers should recognize that restrictive EDs occur in boys/men.
2. Medical providers should recognize that boys/men with restrictive EDs have distinct clinical presentations, medical complications, and considerations for medical management compared with girls/women.

Position 5: The medical and psychological complications of AYAs with ARFID and AAN can be as severe as those with AN (Grade IIaB)

Empirical evidence demonstrates that AYAs with ARFID or AAN are at risk for the same scope and severity of medical complications and psychological comorbidities as AYAs with AN. In one study [18], adolescents with ARFID were more likely to be medically compromised (lower mean BMI Z-score, %TGW, mean heart rate, and bradycardia) than younger children. Males with ARFID had greater mean weight loss than females. More than 50% of postmenarchal females with ARFID had irregular or absent menstruation, with secondary amenorrhea associated with lower mean heart rate. Approximately 40% of all patients with ARFID required hospitalization; the majority were medical admissions. Adolescents with ARFID also had higher rates of anxiety and depression. Another study reported that underweight patients with either ARFID and AN had low bone mineral density associated with low BMI [19].

Similarly, patients with AAN have severe physical and psychological comorbidities despite presenting within or above the normal weight range. Adolescents with AAN have similar rates of bradycardia, orthostatic instability, and secondary amenorrhea, but more severe distress related to eating and body image compared with patients with AN [20,21]. One study found that adolescents with AAN lost more weight over longer periods [20], whereas another found an association between the rate of weight loss and heart rate [21]. Although

objective measures of ED behaviors and cognitions were more severe in AYAs with AAN than AN [20,21], no significant differences in the prevalence of other psychiatric comorbidities (e.g., anxiety, mood disorders, obsessive-compulsive disorder, self-harm) or the severity of comorbidities (e.g., depression) were found [20].

Recommendations

1. Medical providers should be aware that AYAs with ARFID or AAN are at risk of the same medical complications and psychiatric comorbidities as in AYAs with AN.
2. Medical providers should complete a comprehensive assessment of AYAs with ARFID or AAN, assessing for both medical complications and psychiatric comorbidities.

Position 6: Most AYAs with restrictive EDs can be managed as outpatients. Family-based therapy (FBT) is a first-line outpatient psychological treatment for adolescents with AN (Grade 1A)

Most AYAs with restrictive EDs can be managed as outpatients, with ongoing medical assessment and monitoring. FBT is a first-line outpatient psychological therapy because of its efficacy in the treatment of adolescents up to youth aged 18 years [22]. FBT is based on the concept that parental involvement is vital to therapeutic success and that mobilizing parental strengths is central to change the behaviors of adolescents with EDs. Evidence also supports the feasibility and acceptability of FBT with therapists and the short-term effectiveness of manualized FBT for young adults with AN [23]. Limited data suggest that FBT can be adapted for children with ARFID [24] and adolescents with AAN [25]. Over the course of FBT, the medical provider's role is primarily to monitor and manage the medical status of the AYA and to take a lead role in interpreting the physical findings to the primary therapist and the patient and family [26]. As the AYA progresses through FBT, less frequent medical monitoring is required. Other psychological treatments with demonstrated efficacy in AYA with restrictive EDs include adolescent-focused therapy and cognitive behavioral therapy, among others [27].

Recommendations

1. Medical providers require knowledge of the evidence-based psychological treatments for AYAs with restrictive EDs.
2. Medical providers should know that FBT is a first-line outpatient, psychological treatment for adolescents with AN, and has utility in both adolescents with ARFID as well as for some young adults with AN.
3. Medical providers should understand their role in FBT.

Position 7: Inpatient refeeding protocols for AYAs with AN can include higher caloric content and increase more rapidly than the historical standard of care, which commenced with lower calories and advanced slowly (Grade IA)

Factors supporting hospitalization of AYAs with EDs are summarized in Table 4; newer definitions of orthostatic pulse and blood pressure changes [28,29] have been incorporated, consistent with recommendations from other organizations [27,30]. Decisions about admission are based on comprehensive clinical assessment that consider the seriousness of the patient's physical and psychological health, rapidity of weight loss, available outpatient resources, and family support. Some AYAs with restrictive EDs who require admission for medical stabilization may be of normal weight or overweight [11], reinforcing the importance of careful medical monitoring.

Hospitalization of AYAs with EDs requires access to an experienced medical, nutrition, mental health, and nursing team, standardized refeeding protocols, and cardiac monitoring. Effective inpatient treatment of AYAs with AN always starts with adequate nutritional rehabilitation to achieve medical stability. Concerns about the refeeding syndrome had led to conservative refeeding protocols, often starting at <1,200 kcals/day Refeeding hypophosphatemia, the hallmark biochemical feature of refeeding syndrome, is correlated with the degree of malnutrition on admission rather than the initial calories prescribed in hospitalized adolescents with AN [31]. Research supports inpatient refeeding protocols with close medical monitoring that include initial higher calorie content and advance more rapidly than protocols starting at <1,200 kcals/day. A recent randomized controlled trial demonstrated that higher calorie oral refeeding starting at 2,000 kcals/day shortened the period of medical instability and reduced the length of stay without increased risk of refeeding syndrome or rehospitalization in the year following initial admission [32,33]. Approaches to refeeding still vary widely in clinical practice, and a paucity of evidence exists on optimal macronutrient composition or how to identify those at greatest risk, as risk cannot be based on weight alone. Admission for medical stabilization followed by FBT has similar treatment outcomes to more prolonged hospitalization for weight restoration [34].

Recommendations

1. Inpatient refeeding protocols for AYAs with AN include higher calorie content and increase more rapidly than the historical standard of care, which commenced with lower calories and advanced slowly (Grade IA).
2. Prospective clinical trials are required to better understand the safety and efficacy of refeeding approaches in AYAs with AN and extreme malnutrition (<60% mBMI) and in AYA with AAN and ARFID (Grade IV C).

Position 8: Restrictive EDs can affect AYAs of diverse genders, races, ethnicities, sexual orientations, socio-economic backgrounds, and weights (Grade III B)

Restrictive EDs are increasingly identified in AYAs of diverse genders, racial/ethnic groups, and body weights and in lower-income populations [30,35,36]. Sexual minority and transgender AYAs show a higher prevalence of disordered eating behaviors, including dietary restriction [14,30].

Recommendation

1. Medical providers should recognize that restrictive EDs in AYAs can affect diverse genders, races, ethnicities, sexual orientations, socioeconomic backgrounds, and weights.

Position 9: More research, including multicenter studies and prospective registries, is needed to inform the assessment, medical management, and outcomes of restrictive EDs, including in diverse populations (Grade IV C)

Prospective clinical trials are required in AYAs with restrictive EDs to better understand the safety and efficacy of different refeeding approaches and the short- and long-term outcomes of different treatments for physical health and psychological well-being. Research, including multicenter trials, would be facilitated by developing patient registries (Grade IV C).

Recommendation

1. Increased research funding from government agencies and the private sector is needed to study EDs. Research in males and other diverse populations, genetics, brain imaging, refeeding approaches in AYA with extreme malnutrition, AAN, and ARFID, and treatment approaches will advance our understanding of these disorders.

Summary

EDs pose significant health problems for AYAs. Recent research on restrictive EDs in AYAs has yielded important new knowledge regarding diagnosis, demographic heterogeneity, weight restoration, determination of TGW, FBT, and nutritional rehabilitation. As medical providers play a critical role in managing AYAs with restrictive EDs, their knowledge of these advances will promote the delivery of state-of-the art, evidence-based treatment.

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Table 1

Hierarchy of evidence and recommendations grading scheme

Level	Type of evidence	Grade	Evidence
I	Evidence obtained from one or more randomized controlled trials or a meta-analysis of randomized controlled trials	A	At least one randomized controlled trial as part of the body of literature of overall good quality and consistency addressing the specific recommendation (evidence level I) without extrapolation
IIa	Evidence obtained from at least one well-designed controlled study without randomization	B	Well-conducted clinical studies but no randomized controlled trials on the topic of recommendation (evidence levels II or III); or extrapolated from level I evidence
IIb	Evidence obtained from at least one other well-designed quasi-experimental study		
III	Evidence obtained from well-designed nonexperimental descriptive studies, such as comparative studies, correlation studies, and case–control studies		
IV	Evidence obtained from expert committee reports or opinions and/or clinical experiences of respected authorities	C	Consensus of expert opinions (evidence level IV) or extrapolated from level I or II evidence. This grading indicates that directly applicable clinical studies of good quality are absent or not readily available

Keywords included in search: anorexia nervosa, other specified feeding or eating disorders (OSFED), avoidant/restrictive food intake disorder (ARFID), medical management, refeeding, hypophosphatemia, osteoporosis, gender, males, race/ethnicity, sexual orientation, socioeconomic status, overweight, and obesity.

Table 2

Definitions of body mass index, median BMI, and percent median BMI

Term	Abbreviation	Data required and/or calculation
Body mass index	BMI	Weight (kg)/ [Height (m)]^2
Median BMI[a]	mBMI	50th percentile BMI for age and sex[a]
Percent mBMI	%mBMI	(Current BMI/ mBMI) × 100

BMI = body mass index.

[a]Derived from “BMIAGE” percentile data file with LMS parameters, mBMI is “P50”. Available at: http://www.cdc.gov/growthcharts/percentile_data_files.htm.

Table 3

Proposed classification of the degree of malnutrition for adolescents and young adults with eating disorders

	Mild	Moderate	Severe
% mBMI[a]	80%–90%	70%–79%	<70%
BMI Z-score[b]	−1 to −1.9	−2 to −2.9	−3 or greater
Magnitude of weight loss[c]	5%	7.5%	10%
Rapidity of weight loss[d]		5% in 1 month	>5% in 1 month
		7.5% in 3 months	>7.5% in 3 months
		10% in 6 months	>10% in 6 months
		20% in 1 year	>20% in 1 year

One or more of the following would suggest mild, moderate, or severe malnutrition.

[a]Percent median BMI.

[b]Mehta et al. [6].

[c]When two or more data points are available to calculate percent of body mass lost [8].

[d]When two or more data points are available and timeframe is known [10].

Table 4

Factors supporting hospitalization in adolescents and young adults with an eating disorder

One or more of the following justify hospitalization:	
1.	≤75% median BMI for age and sex
2.	Dehydration
3.	Electrolyte disturbance (hypokalemia, hyponatremia, hypophosphatemia)
4.	EKG abnormalities (e.g., prolonged QTc or severe bradycardia)
5.	Physiological instability • Severe bradycardia (heart rate <50 beats/minute daytime; <45 beats/minute at night) • Hypotension (<90/45 mm Hg) • Hypothermia (body temperature <96°F, 35.6°C) • Orthostatic changes in pulse (sustained increase in HR >30 bpm in adults aged >19 years or >40 bpm in adolescents aged <19 years or sustained decrease of blood pressure (>20 mm Hg systolic or >10 mm Hg diastolic) [28,29]
6.	Arrested growth and development
7.	Failure of outpatient treatment
8.	Acute food refusal
9.	Uncontrollable bingeing and purging
10.	Acute medical complications of malnutrition (e.g., syncope, seizures, cardiac failure, pancreatitis, etc.)
11.	Comorbid psychiatric or medical condition that prohibits or limits appropriate outpatient treatment (e.g., severe depression, suicidal ideation, obsessive-compulsive disorder, type 1 diabetes mellitus)

EKG = electrocardiogram; HR = heart rate; QTc = corrected QT.