

Advances in the dietetic management of eating disorders

Cliona Brennan^{1,2}, Sarah J Fuller^{3,4}, Lisa Waldron⁵, Namrata Dhopatkar⁶

1. Maudsley Centre for Child and Adolescent Eating Disorders, South London and Maudsley NHS Foundation Trust, London, UK

2. London Metropolitan University, London, UK

3. Northamptonshire Healthcare NHS Foundation Trust, Kettering, Northamptonshire, UK

4. Division of Psychiatry, Imperial College London, London, UK

5. Community Healthcare West, Health Service Executive (HSE), Galway, Ireland

6. Eating Disorders Unit, South London and Maudsley NHS Foundation Trust, Bethlem Royal Hospital, London, UK

✉ Corresponding author: Cliona Brennan. Email: cliona.brennan@slam.nhs.uk

ORCID

Cliona Brennan: 0000-0003-0041-5196

Sarah J Fuller: 0000-0002-2863-158X

Abstract

Eating disorders (EDs) are highly complex illnesses, compromising both physical and mental health. Dietetic management of EDs has advanced over time, in line with research and clinical practice in the field. Progress in dietetic practice relates to the core domains of refeeding syndrome management, nutritional rehabilitation and nutritional psychoeducation. Advances in these domains are discussed in this narrative review. Future trends in health and disease that may shape further advances in the dietetic management of EDs are highlighted and their potential impact on nutritional interventions hypothesised. This review highlights the integral role of dietitians as part of an eating disorder multidisciplinary team. The skills and knowledge of the dietetic profession continues to advance and evolve in line with the expanding ED evidence base, supporting evidence-based dietetic practice and the ongoing development of nutritional strategies in this area.

1. Introduction

Dietetics was first defined as "the application of the science of nutrition to the human being in health and disease" (1). However, the role of the dietitian has evolved over time, from a profession that purely focused on food provision for hospitalised patients to a role that necessitates broad knowledge and specialist skills to enable practitioners to lead on clinical, educational, managerial and research tasks (2). Dietitians are skilled in assisting clients with their understanding of the effects of nutrition on health, supporting other health professionals to improve their understanding of the role of nutrition in illness, providing group education sessions on various aspects of nutrition and engaging in academic writing and publication of research (3). The ability to communicate and work collaboratively is therefore central to every dietitian's role across clinical specialities, and particularly in working with clients with eating disorders (EDs).

EDs are highly complex illnesses, compromising both physical and mental health (4). The conceptualisation of EDs has grown over the past decade to include diagnoses such as binge eating disorder and avoidant/restrictive food intake disorder (ARFID), in addition to the more well-known disorders of anorexia nervosa (AN) and bulimia nervosa (BN) (5, 6). Disordered eating and psychological morbidity are symptoms common to all eating disorder presentations that pose risks to health (7). Management of ED symptoms and treatment of the underlying causes necessitates the involvement of a skilled multidisciplinary team (MDT) (8), including a dietitian.

Dietetic interventions are recommended as part of the specialist MDT, wherein therapy and medical management are central parts of treatment that are delivered by professionals qualified in psychiatry, psychology and family therapy including nurse therapists and paediatricians/physicians (7, 9). Dietitians are skilled in the assessment and management of malnutrition, disordered eating patterns and nutritional-related deficiencies (1, 10). Dietitians are well placed to support nutritional issues arising from these illnesses and are considered to form a central part of the MDT (10, 11). All ED professionals play a role in the nutritional management of EDs, such as discussions about meal plans and reviews of progress with eating and weight changes. Dietitians lead on specific nutritional issues including the management of acute refeeding syndrome (RS) risk, bespoke meal planning for weight gain, identifying and managing nutritional deficiencies and providing specific nutritional psychoeducation.

Dietetic management of ED care has advanced over time, in keeping with research and clinical practice in the field. Historically, limited literature regarding the dietetic management of patients with an ED existed and no manualised dietetic interventions were available (12). Over recent years, the role of dietetics in ED treatment has been explored in

adult populations and the views of MDT members, clients and dietitians have been used to develop consensus guidelines in this area (12-14). These advances have enabled the evaluation of dietetic practice in ED, definition of the role of the dietitian in the ED MDT and the development of specific dietetic resources for this client group (15).

A systematic review conducted by Yang et al. evaluated published literature relating to the role of the dietitian in ED care to determine the effect of dietetic input and contribute to the understanding of this role in ED treatment (13). One key finding was that dietetic input improved weight and nutritional intake. However, the small number of studies available on the topic was a limitation. Another review conducted by Heafala et al. investigated the dietitian's role in ED treatment by analysing literature related to the views and experiences of ED staff (16). Themes that emerged evidenced the role of dietitians as collaborators, educators and counsellors in ED teams. Progress in dietetic practice relates to the core domains of RS management, nutritional rehabilitation and nutritional psychoeducation. This narrative review will focus on advances in the dietetic management of EDs in relation to these domains.

2. Refeeding syndrome management

RS is a potentially fatal clinical condition that can occur during the nutritional rehabilitation of malnourished patients (17). Low body weight, rapid weight loss and severe restriction of dietary intake are all risk factors for RS. The condition can manifest as cardiac arrhythmias, cardiac failure and arrest, coma and sudden death (18). The majority of research on RS management in EDs is focused on AN, given that restrictive eating, weight loss and low weight are salient characteristics of this disorder (19).

Historically, "start low and advance slow" was the recommended approach to restoring nutritional intake in patients deemed at risk of the condition (20, 21). Cautious approaches to nutritional rehabilitation, including low energy starting rates with incremental increases towards total energy requirements and prophylactic phosphate supplementation, were advocated to negate the risk of complications occurring (22). Recognition of risks associated with underfeeding already malnourished patients has challenged previous guidance in this area and advocated for a less conservative approach (23, 24). Key ED literature has also identified that greater weight gain during initial treatment predicts full remission after one year, placing further emphasis on the swift restoration of regular and adequate nutrition (25).

There has been a growing body of evidence supporting less conservative refeeding practices in AN, such as higher energy initial feeding without stepped increases or prophylactic phosphate administration (18, 26, 27). National guidance and recommendations on the management of RS risk in EDs has been reviewed and updated to incorporate the findings of pivotal research studies (7). Most research to date has focused on young people with AN, with national guidance calling for increased research focused on adults. Three key dietetic-led studies investigating RS in adolescents with AN have supported advancements both in clinical practice and national guidance on refeeding management in EDs (18, 26, 27).

The randomised controlled trial conducted by O'Connor and colleagues provided the first conclusive evidence supporting less conservative refeeding practices in adolescent patients. Benefits such as greater initial weight gain resulted from higher energy starting rates, in the absence of increased refeeding complications. These findings supported initial refeeding commencing at a higher rate (1200 kcal/d) than was recommended by national guidance at that time (500 kcal/d) and supported advancements in clinical practice (26, 28).

In light of the growing number of studies investigating approaches to refeeding practices in AN, Garber and colleagues systematically reviewed this literature in 2016 (18). The conclusions drawn from this review advocated higher calorie feeding in AN for moderately but not severely malnourished patients. Garber et al. conducted another significant study in 2021, comparing the short-term efficacy, safety and cost savings of higher (2000 kcal/d) versus lower (1400 kcal/d) calorie feeding in AN (27). Findings from this study indicated that initial higher calorie refeeding was safe, effective and did not increase complications associated with refeeding in this population of moderately malnourished adolescents. Cost savings were also demonstrated as a result of reduced length of hospital admissions related to swift refeeding (27). The updated UK national guidance, *Managing Emergencies in Eating Disorders* (7), has replaced the previous junior MaRSiPAN and adult MaRSiPAN (Management of Really Sick Patients with Anorexia Nervosa) reports (28) and has incorporated these key findings.

Dietitians have a core role in the management of RS risk in ED care (29) and have been crucial in supporting the advancements observed in this over the past decade. The dietitian's role remains embedded within the MDT responsible for treating all aspects of an ED. Whilst dietitians are generally responsible for nutritional aspects of refeeding malnourished patients (e.g., distribution of energy in feeds through the day, use of oral nutritional supplements, enteral feeding and micronutrient supplementation), medical, nursing and psychiatric staff are integral to the safe management of risk associated with this early stage of treatment (7, 9).

3. Nutritional rehabilitation

The initial steps in treatment for EDs focus on medical stabilisation (where required), the management of medical and psychiatric risks and the restoration of regular and sufficient nutrition (7, 19). Nutritional rehabilitation, alongside psy-

chological treatment and continued management of risks, is an integral part of ED treatment that typically follows on from this first stabilisation phase. The role of dietetics has expanded and evolved over time to ensure evidence-based practice in the treatment of EDs, with a particular focus in recent years on newer diagnoses such as ARFID and atypical presentation of EDs such as non-underweight AN, termed atypical anorexia nervosa (AAN) (5, 13). Recognition of the strong overlap between autism and EDs has also led to advances in treatments for this common comorbidity, including adaptations to dietetic interventions and guidance documents (30). Advances in the nutritional assessment and management of ARFID, AAN and comorbid autism and ED will be focused on here.

3.1 Avoidant/restrictive food intake disorder

ARFID, added to the DSM-5 under the revised *Feeding and Eating Disorders* chapter in 2013, is characterised by restrictive eating that is associated with failure to meet nutritional requirements leading to faltering growth in children, significant weight loss and/or persistent low weight and compromised physical health (31). Nutritional deficiencies and impaired psychosocial functioning are common issues requiring specialist MDT treatment (5). The core feature of ARFID that distinguishes it from other EDs (i.e., AN and BN) is the lack of disturbance in the way one's body weight or shape is experienced (6).

	ARFID	AN
Weight at presentation	Underweight/normal/overweight	Underweight (typical) Normal/overweight (atypical)
Peak age at onset	4-13 years	13-15 years
Gender distribution	Higher proportion in males	Higher proportion in females
Composition of diet	Limited amount/range of foods, often based on appearance, texture, taste etc.	Limited amount/range based on calorie content Range may also be reduced if cutting out feared foods
Attitude towards gaining weight	Generally not concerned by weight gain or want to gain weight	Fear of weight gain
Attitude towards feeding by NGT	Require use of tube feeding more often and readily accept calorie content	May detest use of tube feeding as worried about calorie content
Comorbidity	Increased incidence of anxiety Increased incidence of comorbid medical illness	Increased incidence of depression Lower incidence of associated medical illness

Table 1. A comparison of avoidant/restrictive food intake disorder and anorexia nervosa (adapted from Coglán and Otasowie (32))

Abbreviations: AN = anorexia nervosa; ARFID = avoidant/restrictive food intake disorder; NGT = nasogastric tube feeding

Treatment for ARFID includes psychological, medical and nutritional assessment and management by appropriately qualified and experienced health professionals. A collaborative MDT approach is imperative for the effective and safe treatment of ARFID (33). Over the past decade, research and evidence related to the management of ARFID has greatly expanded, including nutritional approaches and dietetic practice in this area (34). Advancements in the diagnosis of ARFID specified in the DSM-5, such as subtyping, have supported the development of dietetic interventions (35). These subtypes describe food avoidance based on the following three key drivers: an apparent lack of interest in eating or food; nutritional avoidance based on the sensory characteristics of food; or concerns about the aversive consequences of eating (6, 31, 32).

The nature of dietetic intervention is dependent upon ARFID subtype, in addition to the level of nutritional risk (36). Ensuring adequate nutrition in terms of both energy intake and sufficient dietary variety to avoid nutritional deficiencies are common goals across subtypes (32). In presentations of sensory-based food avoidance or fears around the aversive consequences of eating, preferred foods are encouraged to sustain adequate energy intake, whilst graded food exposure is simultaneously used to introduce previously rejected or feared foods (32). Where an apparent disinterest in food or eating is the driver of the avoidance, strategies recommended include the implementation of structured routines around mealtimes and behavioural expectations around eating, whilst also increasing meal portion sizes to promote sufficient energy intake (37).

Nutritional support may be offered via food-based interventions, oral nutritional supplementation, enteral feeding interventions or a combination of these feeding methods depending on level of nutritional risk and motivating factors for food avoidance (33, 38). Collaborative MDT working is essential to support recovery and dietitians are central members of these treating teams, providing important nutritional interventions.

3.2 Atypical anorexia nervosa

Patients who are not clinically underweight but have lost significant amounts of weight and otherwise resemble all characteristics of AN are now diagnosed with other specified feeding or eating disorder (OSFED) (6, 39). AAN, a term

used clinically to describe this patient group, is listed as an example of a presentation within OSFED. Recognition of AAN as a distinct presentation remains relatively new, with a limited but quickly expanding evidence base related to its management and outcomes (40). Research and evidence relating to medical complications of AAN is limited (41). Available literature relating to this subset of patients indicates that physical and psychological morbidity are similar to AN (42, 43). Patients diagnosed with AAN frequently require acute hospital admission to treat medical complications related to weight loss and malnutrition, despite the absence of severe underweight (44).

AN	OSFED (e.g., AAN)
A. Restriction in energy intake relative to requirements leading to a significantly low body weight in the context of age, sex, developmental trajectory and physical health.	All criteria are met, except despite significant weight loss, the individual's weight is within or above the normal range.
B. Intense fear of gaining weight or becoming fat, even though underweight.	
C. Disturbance in the way in which one's body weight or shape is experienced, undue influence of body weight or shape on self-evaluation or denial of the seriousness of the current low body weight.	

Table 2. A comparison of anorexia nervosa and other specified feeding or eating disorder (adapted from Brennan et al. (40))

Abbreviations: AAN = atypical anorexia nervosa; AN = anorexia nervosa; OSFED = other specified feeding or eating disorder

Despite the absence of underweight, malnutrition and nutritional risks are common in AAN (45). A number of key dietetic-led studies comparing patients with AN and AAN have supported recognition of the nutritional risks associated with this presentation (40, 41). Whitelaw et al. compared the effects of weight loss in comparison to underweight on medical and nutritional risk in adolescents with AN and AAN and concluded that weight loss was a stronger predictor of many physical complications that cause hospital admission than underweight (43). Similarly, Garber et al. also found that weight loss history was associated with markers of malnutrition across a range of body weights, independent of underweight (44).

Research on AAN has evidenced the importance of nutritional recovery and supports a similar dietetic approach as advised in AN (45). Specific advancements in dietetic management of AAN relate to the assessment and management of RS and adaptations to early phases of treatment, which often focuses on weight restoration in typical presentations. The primary aim of treatment in both AN and AAN is to restore regular and adequate nutrition, whilst managing medical and psychiatric risks. Assessment and management of RS risk is required in AAN due to the rapid weight loss often observed in these patients (46). The recognition of rapid weight loss as a key indicator of RS risk in the absence of low weight has supported routine nutritional and physical health assessment across weight ranges, rather than limited to those that are underweight (40).

Dietitians have also been recognised for their crucial role in individualising treatment in AAN, in particular, in adapting and creating bespoke meal plans or nutritional advice, supporting a patient-centred approach. This has been particularly apparent during the initial phases of the treatment, where nutritional rehabilitation most often takes place, in atypical cases presenting at healthy weights (47). Whilst some patients with AAN may present above the recommended body mass index (BMI), weight loss is not recommended until the ED has resolved (45). Dietetic interventions should focus on restoring regular and balanced eating whilst challenging food rules and restrictions that are driven by the ED, regardless of whether weight falls within underweight, healthy or overweight categories (42, 48). Historically, physical health and nutritional risk assessment were limited to the underweight, leading to symptoms being missed and diagnoses and treatment being delayed in the AAN population (49, 50). Dietetic advances have supported more inclusive and robust practices in the management of AAN.

3.3 Autism and EDs

In recent years, research has shown a strong link between autism, a neurodevelopmental disorder characterised by problems in social and communicative functioning and restricted patterns of behaviour, and EDs (51). The relationship between autism and EDs has been explained by common underlying neuropsychological and social problems (51). In addition, poorer treatment outcomes have been observed in this relatively commonly occurring comorbidity (52). As such, there has been a focus on the development of adaptations to ED treatment to support the characteristics of those presenting with comorbid autism better (30). PEACE (Pathway for Eating disorders and Autism developed from Clinical Experience) was developed to support people with these co-occurring conditions and provides guidance on helpful treatment adaptations (30). As part of the PEACE pathway, dietetic interventions for EDs were reviewed and adaptations recommended to support the advancement of dietetic practice in this area.

Key adaptations recommended for the dietetic management of patients with ED and autism relate to both assessment and intervention. Adaptations to dietetic assessment include seeking information that may be more relevant to the care of people with autistic features, such as information on eating behaviour in childhood, sensory sensitiv-

ities, preferences related to the way food is presented or rules around food and eating that predate the ED (30, 51). Research on autism and ED from the PEACE pathway has also informed advances in dietetic treatment that better support the thinking styles of patients with autism characteristics. Expectations of nutritional rehabilitation may differ in terms of the pace of dietary change, as well as the extent of dietary variety that is encouraged. As such, the use of oral nutritional supplements and vitamin and mineral supplements should be considered to ensure nutritional requirements are met (30). Dietetic management of this complex presentation should always be as part of specialist MDT treatment and research investigating further helpful treatment adaptations is ongoing.

4. Nutritional psychoeducation

Following the expansion of dietetic literature in EDs, the development of manualised dietetic interventions further advanced dietetic practice and nutritional psychoeducation (12). The study by McMaster et al. advised on five dietitian-delivered outpatient sessions that cover the core aspects of the nutritional management of EDs (refeeding, nutritional rehabilitation, social eating, food variety and flexibility and further treatment planning) (12). Pre- and post-intervention assessments are also illustrated in the study (12). Another pivotal research paper by Hart et al. proposed the first eating disorder-specific food guide, the REAL Food Guide (15).

4.1 The REAL Food Guide

The REAL Food Guide (Recovery from EAting disorders for Life) is a framework that uses core principles of nutrition but with consideration of the beliefs and misinformation that are frequently endorsed by individuals with EDs (15). Prior to this, only generic food guides were widely available and typically these advocated for weight loss in the context of the obesity epidemic (53). One such guide was the Eatwell plate, published in the UK in 2016, reflecting the national government's agenda regarding rising obesity rates. As a result, it promoted healthy eating with the aim of weight loss (53). It included calorie guides and advised against high-fat and sugary foods, or foods often enjoyed in a social context, inferring that these were not part of a healthy diet. In response to this, a consensus statement was produced by the British Dietetic Association Mental Health Specialist Group highlighting concerns about the Eatwell plate and declaring it inappropriate for use in ED recovery (54).

The REAL Food Guide was produced in Australia in 2018 to support recovery goals for those experiencing ED. It emphasises food variety and including energy-dense foods to aid recovery. It also included "fun" or "social" foods in recovery, acknowledging that these foods are part of normalised eating behaviours (15). Although it is widely used in the UK by ED dietitians, several limitations have been noted, such as the lack of vegetarian- or vegan-specific recommendations, its application to the inpatient setting and its application to those with ED who are less than 18 years old (15).

4.2 Dietetic management of veganism and eating disorders

Although the link between vegetarianism and the development of EDs is well established in the literature (55, 56), the relationship between veganism and EDs is unclear. Despite this, an increasing number of vegan patients are presenting to ED services (55). This, alongside an improved awareness of equality and human rights legislation, supported the drive towards the development of additional nutritional resources to support these patients during recovery.

Restoring regular eating and nutritional restoration is required to treat EDs, and as treatment progresses it is important to challenge rules established by the ED and/or challenge feared foods. Conflict could potentially arise between a patient and a treating team if, in line with the ED developing, socially acceptable dietary restrictions are adopted, as these could be masking or justifying ED behaviours in the avoidance of foods. In modern society there is an abundance of dietary choice and restrictions available, ranging from gluten free to milk free to vegetarian and veganism. Veganism is becoming more culturally acceptable in the Western world and ED clinicians report an increased prevalence above the national average within the ED population (55). As a result, dietitians have developed practice guidelines regarding the acceptance of veganism and how to support recovery (54). A vegan REAL Food Guide has also been developed to help clinicians support patients with EDs whilst following a vegan diet (55). These advances aim to support a more collaborative and inclusive approach to nutritional interventions for ED sufferers.

5. Future trends and potential impact on dietetic practice in EDs

The dietetic management of EDs has advanced and evolved over the past decade, in line with the ever-evolving landscape of human health and disease over time. Research and trends that may impact on dietetic interventions with ED service users are considerations for further advances in dietetic practice.

One such research avenue includes the role of the gut microbiome in the pathogenesis and maintenance of EDs (57, 58), in gastrointestinal symptoms experienced by patients with EDs, in comorbid conditions such as depression and anxiety disorders, and in various aspects of physical health of the individual (59). Modifying the gut microbiome through the types of foods consumed, probiotics and prebiotics are likely trends that individuals with EDs may want to follow, and dietitians will be well placed in guiding them, based on current and rigorous evidence.

Another topic in recent news is the effect of ultra-processed foods (60) on cardiovascular health and obesity trends

(61) and their possible effect on binge eating (62). These messages may feed into the fear of foods that individuals with EDs experience, and dietitians may encounter resistance to their message that sufferers need to include a variety of foods, including "fun foods", within their nutritional intake. The dietitian may need to decipher the evidence and work with the individual towards a measured stance on nutrition. These trends may support future advances in nutritional approaches and interventions used within ED care.

6. Conclusion

This review has highlighted and discussed just a small number of pivotal advances in the dietetic management of EDs. Dietitians are integral members of the ED MDT, providing valuable contributions to research, national guidance and clinical practice in ED management. Their role has progressed beyond being simple advisors on nutrition to being more holistic care providers within the ED team. Research will continue to shape evidence-based dietetic practice and support further advances and contributions to ED care from the profession.

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