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# What and how do people recovered from eating disorders eat? A systematic literature review.

A thesis presented in partial fulfilment of the requirements for the degree of

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## **Abstract**

**Background:** There is a lack of attention on eating and eating-related behaviours once individuals are recovered from eating disorders (EDs). What and how an individual recovered from EDs eats remain unclear.

**Aim:** The aim of this study is to examine the dietary intake and eating behaviour in individuals recovered from an ED.

**Methods:** We conducted a systematic literature review in accordance with the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) statement guidelines. Five electronic databases were searched with no restriction on study dates and study design. Included studies reported this review's primary outcome, dietary intake and eating behaviour. Results were described using a narrative synthesis. The Mixed Methods Appraisal Tool was used for quality appraisal. Details of the protocol for this systematic review was registered on PROSPERO (International Prospective Register for Systemic Reviews, Registration Number: CRD420250605506).

**Results:** From a total of 21,864 records, 20 studies met eligibility criteria. Individuals recovered from EDs had low energy and fat intake compared to the general population. Through examining micronutrient intakes, individuals recovered from AN implied to have higher intake of fruits and vegetables, but lower intake of dairy and meat compared to the general population. With regards to eating behaviour, recovered individuals in our review had a regular eating pattern of at least three meals a day and included the intake of previously avoided or restricted foods into their diet.

**Conclusion:** This review highlights differences in dietary patterns between those recovered from EDs and the general population. Common restrictive eating behaviours found in individuals with active EDs such as low fat intake, low energy intake, high vegetable and fruit intake, and low dairy and meat intake are also found in individuals recovered from EDs, but to a lesser degree. Overall, eating in individuals recovered from EDs looks largely different from the general population and from individuals with active EDs. The restrictive dietary patterns of recovered individuals warrant further investigation into the nutrient intake and eating behaviours of this group.

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## **Abbreviations**

|        |                                                                    |
|--------|--------------------------------------------------------------------|
| AN     | Anorexia Nervosa                                                   |
| ANZAED | Australia & New Zealand Academy for Eating Disorders               |
| BED    | Binge Eating Disorder                                              |
| BMI    | Body Mass Index                                                    |
| BN     | Bulimia Nervosa                                                    |
| CBT    | Cognitive Behavioural Therapy                                      |
| DSM-4  | Diagnostic and Statistical Manual of Mental Disorders, 4th Edition |
| DSM-5  | Diagnostic and Statistical Manual of Mental Disorders, 5th Edition |
| ED     | Eating Disorder                                                    |
| EDE-Q  | Eating Disorder Examination Questionnaire                          |
| EDNOS  | Eating Disorder Not Otherwise Specified                            |
| FBT    | Family Based Therapy                                               |
| OSFED  | Other Specified Feeding or Eating Disorder                         |
| RDI    | Recommended Dietary Intake                                         |
| REAL   | Recovery from Eating Disorders for Life                            |
| UK     | United Kingdom                                                     |
| US     | United States                                                      |

## Chapter 1: Introduction

### 1.1 Background

Eating Disorders (EDs) are defined as psychiatric conditions characterised by disturbances in eating behaviour leading to physiological and psychological complications (American Psychiatric Association, 2022). Anorexia Nervosa (AN), Bulimia Nervosa (BN), and Binge Eating Disorder (BED) are three EDs that share underlying psychopathology including low self-esteem and body dissatisfaction. AN is characterised by low body weight and restrictive behaviour, BN is characterised by binge eating along with purging, while BED is characterised by binge eating without purging.

Other Specified Feeding or Eating Disorder (OSFED), previously known as Eating Disorder Not Otherwise Specified (EDNOS) in the Diagnostic and Statistical Manual of Mental Disorders, 4th Edition (DSM-4) (American Psychiatric Association, 1994), includes Atypical Anorexia Nervosa, Bulimia nervosa (of low frequency and/or limited duration), and Binge-eating disorder (of low frequency and/or limited duration). These OSFEDs share the same psychopathology but do not meet all the physical or behavioural criteria for their AN, BN, and BED counterpart.

Due to its growing prevalence and severity, EDs have become an increasingly concerning public health problem. EDs are estimated to affect 8.4% of females and 2.2% of males at any point in their lifetime (Galmiche et al., 2019). In the past three decades, global prevalence rates for EDs increased from 300.73 to 354.72 per 100,000 individuals, and prevalence rates are suggested to continue rising through 2035 (Liu et al., 2025). EDs are known to have the highest mortality rate out of all psychiatric disorders (Miskovic-Wheatley et al., 2023). Those with AN have a 5.21 times increased risk of mortality, while those with BN have a 2.51 times increased risk and those with EDNOS have a 2.2 times increased risk (Krug et al., 2025). Additionally, the annual economic cost of EDs is estimated to be \$64.6 billion in the United States (US) alone (Streatfeild et al., 2021). Medical and psychiatric comorbidities associated with EDs can range from mild to severe complications and are sometimes life-threatening. These comorbidities include electrolyte and fluid imbalances, cardiac problems, oedema, major depressive disorder, mood disorders, and substance use disorders (Hambleton et al., 2022; Kowalewska et al., 2024).

Current guidelines emphasise psychological therapy as the primary intervention for EDs (Himmerich et al., 2023; National Guideline Alliance UK, 2017). Psychological therapy combined with dietetic intervention is highlighted as an essential part of ED treatment (Heruc, Hart, et al., 2020; Heruc, Hurst, et al., 2020; McMaster et al., 2021; Ozier & Henry, 2011). However, dietetic intervention is not always a component of ED treatment and is only offered as a part of multidisciplinary approach. Despite being the first-line treatment for EDs, recovery rates and

efficacy of psychological therapies are still concerningly low. A randomised clinical trial including 187 participants with AN found that only about 25% of patients fully recovered after treatment, while 25% did not respond to outpatient treatment (Cardi et al., 2020). In a meta-analysis including 415 studies published between 1980 and 2021 and with 88,372 participants, there was only a 46% recovery rate across all EDs (Solmi et al., 2024). Recovery rate was found to increase up to 67% as the duration of follow up increased.

Studies in the ED field define recovery based on physical, behavioural, and psychological indices (Bardone-Cone et al., 2010; Bardone-Cone et al., 2018; de Vos et al., 2017). Physical criteria focus on weight, body mass index (BMI), and menses (Franko et al., 2018; Mustelin et al., 2016; Pfuhl et al., 2016), while behavioural criteria are based on the absence of bingeing, purging, and fasting (Bang et al., 2017; Bentz et al., 2017; Eddy et al., 2017), and psychological or cognitive criteria often includes psychometric scores measuring body image and weight concerns (Castellini et al., 2018; Halvorsen et al., 2018; Scaife et al., 2017). Other disordered behaviours such as the avoidance of specific foods, rigid food rules, and only eating when alone are not measured in the Diagnostic and Statistical Manual of Mental Disorders, 5th Edition (DSM-5) criteria or in most definitions of recovery. Nonetheless, ED treatment guidelines emphasise that one of the main goals of treatment is to eliminate disordered eating behaviours, including the ones not mentioned in recovery criteria (Heruc, Hart, et al., 2020; Lock, 2011; Murphy et al., 2010; Sterling et al., 2019).

Bardone-Cone et al. (2010) proposed that individuals recovered from EDs should be identical to those who do not have a history with EDs regarding behavioural and psychological indices. But current studies do not assess disordered behaviours outside of fasting, bingeing, and purging, leading to incomplete assessments of behavioural recovery. De la Rie et al. (2005) found that quality of life in recovered individuals remains poorer than healthy controls despite recovery of symptoms. These authors suggest that residual effects of EDs persist even after recovery. Therefore, investigating eating-related behaviours beyond those commonly studied will clarify which behaviours will persist or resolve after recovery.

Currently, there are only a limited number of studies that measure dietary intake and eating patterns in people with EDs, especially for people who have recovered from EDs. At the time of this thesis, there are no literature reviews pulling together the data on nutrient intake and eating behaviour of those recovered from EDs. This systematic literature review and narrative synthesis will synthesise and report what and how people recovered from EDs eat. These quantitative measures of food intake will allow for direct comparison with other samples and populations including the general population and treatment guidelines. This thesis will provide a more complete description of the eating aspect in ED, helping inform future research on prevention, treatment, and maintenance of remission.

## 1.2 Aims & Objectives

The overall aim of this systematic review is to describe the nutrient intake and eating behaviour of individuals recovered from an ED.

Specific aims and objectives include:

- 1) Investigate the quantitative measures of dietary intake of people who have recovered from EDs.
  - a) Describe quantitative measures of dietary intake, including macronutrients and micronutrients.
  - b) Compare and contrast quantitative measures of dietary intake between recovered individuals with general population intake and recommendations.
- 2) Investigate eating behaviours of people recovered from EDs.
  - a) Describe eating behaviours of recovered ED patients including the intake of specific foods, frequency of meals, food restriction/avoidance, and eating in a social setting.
  - b) Compare and contrast eating behaviours between recovered individuals with general population intake and recommendations.

## 1.3 Structure of Thesis

Chapter 1 provides an overview to the thesis as well as the aims and objectives, structure of the thesis, and researchers' contributions.

Chapter 2 is a literature review examining the existing literature on eating in individuals with EDs. This section encompasses a brief background on EDs, costs and outcomes of EDs, nutritional issues of EDs, ED treatment guidelines on nutrition, definitions of recovery from EDs, and a review of previous studies on dietary intake and eating behaviours in EDs.

Chapter 3 is the research manuscript of this narrative synthesis and presents the systematic literature review and narrative synthesis of this thesis. This chapter consists of an abstract, introduction, methods, results, discussion, and conclusion.

Chapter 4 presents an overall summary of the findings, discussion, strengths and limitations, recommendations for future research, and practice implications.

Appendices provide additional tables, charts, and detailed information acknowledged across all chapters.

## 1.4 Researcher's Contributions

| Researcher                      | Contribution                                                                                                                 |
|---------------------------------|------------------------------------------------------------------------------------------------------------------------------|
| Hae Jun Kim<br>Master's Student | Responsible for literature search, data extraction, data synthesis, quality assessment, and writing all parts of the thesis. |

|                                           |                                                                                                                                                                                          |
|-------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Ms Garalynne Stiles<br>Primary Supervisor | Responsible for study conceptualisation and design.<br><br>Provided guidance throughout and reviewed literature search, data extraction, data synthesis, quality assessment, and thesis. |
| Dr Robyn Lawrence<br>Secondary Supervisor | Provided input into study design, assisted with data extraction, data synthesis and quality assessment and provided guidance and review of literature search and thesis writing.         |

## **Chapter 2: Literature Review**

### **2.1 Background**

#### **2.1.1 Broad description of eating disorders**

EDs are psychological conditions characterised by persistent disturbance in eating behaviour leading to physiological and psychological dysfunction, as defined by the Diagnostic and Statistical Manual of Mental Disorders, Fifth Edition, Text Revision (DSM-5-TR) (2022). The DSM-5-TR describes four common EDs: AN, BN, BED, and OSFED.

#### **2.1.2 Prevalence and mortality rates**

There are growing concerns with EDs due to the global rise in the prevalence and severity of EDs in the general population (Hoek, 2025). EDs are estimated to affect 55.5 million individuals worldwide each year (Santomauro et al., 2021). Some demographics are more likely to have EDs. For example, EDs occur more frequently among females than males, with a ratio of 12 to 1 for AN, 5.8 to 1 for BN, and 3 to 1 for BED (Udo & Grilo, 2018). A systematic review reported lifetime prevalence rates of EDs among women is estimated to be 8.4% (including EDNOS and OSFED) in women, while only 2.2% in men (Galmiche et al., 2019). This difference in prevalence rates is also emphasised when comparing lifetime prevalence between different types of EDs. Lifetime prevalence for AN of 1.4% for women and 0.2% for men, for BN of 1.9% for women and 0.6% for men, and for BED of 2.8% for women and 1.0% for men (Galmiche et al., 2019).

With regards to age, EDs often start to develop early in life. Eighty-six percent of all EDs being diagnosed before individuals reach their twenties (Ross, 2007). These disorders are the third most common chronic condition among adolescents (Herpertz-Dahlmann, 2015). In a systematic literature review, the authors found that the proportion of individuals with onset of eating disorders or problems before the ages of 14, 18, 25 were 15.8%, 48.1%, 82.4%, and peak age of onset was 15.5 years (Solmi et al., 2022).

Research has suggested that the actual prevalence of EDs is likely to be greatly underestimated due to factors such as not meeting the strict diagnostic criteria for an ED (Hoek & Van Hoeken, 2003), or the reluctance to disclose information about one's eating behaviours (Schumann, 2009). Herpertz-Dahlmann's (2009) literature review found that prevalence data for EDs are also confounded by an individual's choice to not seek medical treatment if afflicted with an ED, difficulty in recognizing early signs of EDs, variability in screening and referral practices, and variance in interpretation of diagnostic criteria by clinicians.

EDs are reported to have the highest mortality rate among all psychiatric disorders Miskovic-Wheatley et al. (2023). In a literature review looking at the burden of EDs, the authors found that

individuals with EDs are at significantly increased risk of comorbidities (e.g. amenorrhea, psychiatric disorders, gastric rupture, cardiac arrhythmias, and even death) and have a mortality risk two to five times higher than those without an ED (van Hoeken & Hoek, 2020). A meta-analysis published in 2011, which included 17,272 unique patients across 36 studies, found that individuals with AN had a nearly six-fold increase in mortality compared to the general population with a standardized mortality ratio of 5.9, nearly two-fold increase in mortality for EDNOS (a category in the DSM-IV which includes BED (American Psychiatric Association, 1994)) with a standardized mortality ratio of 1.9, and a nearly two-fold increase in mortality for BN with a standardized mortality ratio of 1.9 (Arcelus et al., 2011). While EDs are known for their significantly large mortality rate, EDs are also associated with detrimental effects on physiological and psychological health and wellbeing (American Psychiatric Association, 2022).

### 2.1.3 Complications and consequences of EDs

Common symptoms of EDs can lead to medical complications (Attia & Walsh, 2025). For example, severely low body weight as a result of restricted energy intake is a characteristic commonly found in individuals with AN. Low body weight can result in medical complications including endocrine abnormalities, cardiac problems, and osteoporosis. In a systematic literature review of 5 studies of 548 females with AN, the frequency of oligomenorrhea or amenorrhea was 77.7% (Walsh et al., 2023). Altered gonadotropin secretion has been associated with low levels of luteinising hormone, which leads to hypothalamic amenorrhea (Misra & Klibanski, 2014). Resumption of menses usually occurs after weight returns to more than 90% of ideal body weight (Golden et al., 1997). However, some patients may have prolonged amenorrhea even after weight restoration (Jacoangeli et al., 2006).

Abnormal eating patterns and their physiological consequences are powerful perpetual factors that impede progress towards recovery. Carrying the desire for unrealistically low body weight, these abnormal eating patterns of extremely restrictive eating and binge-eating lead to frequent and significant weight fluctuations. Starvation, which is often seen in patients with AN who restrict dietary intake, has psychological and physiological consequences that can act as perpetuating factors which contributes to protracted course toward recovery. Psychological and physiological effects of starvation include deterioration in mood (Grave et al., 2011), increased food preoccupations making the control of food and eating even more important obligations (Grave et al., 2011), and delayed gastric emptying and reduced gastric mobility which can augment the perception of fullness (Riedlinger et al., 2020).

Cardiovascular complications arising from EDs are associated with a significant risk for death. For example, EDs have the highest mortality rate for any psychiatric disorder mainly due to cardiovascular complications such as sudden cardiac arrhythmic death related to bradycardia,

electrolyte disturbances, and QT<sub>c</sub> interval prolongation (Casiero & Frishman, 2006; Golden & Meyer, 2004). Low body weight is suggested to be a significant risk factor for cardiac complications, especially bradycardia. Bradycardia in individuals with AN is associated with increased vagal tone secondary to significantly low body weight (Kollai et al., 1994). Additionally, bradycardia in individuals with AN is suggested to be reversible with weight gain (Olivares et al., 2005).

Severe malnutrition and endocrine abnormalities due to AN are associated with osteoporosis (Misra & Klibanski, 2014), a disease characterised by poor bone strength leading to increased risk of fractures (Sözen et al., 2016). A meta-analysis, consisting of 57 studies for a total of 21,607 participants, found that more than one in five people with AN have osteoporosis (Solmi et al., 2016). In a cohort study following 14,414 individuals with AN, Søbey et al. (2023) found that AN was associated with a 46% increased risk of fracture up to 40 years after diagnosis. The loss in bone mineral density may leave irreversible damage to bone health even after recovery from AN. Although both calcium and vitamin D are essential for maintaining bone mineral density, these micronutrients by themselves do not restore bone mineral density (Mehler & MacKenzie, 2009). Rather, weight gain and resumption of menses are associated with significant increases in spine and hip bone mineral density (Miller et al., 2006), indicating the importance of adequate energy intake for weight restoration.

Individuals who have been malnourished for a long period of time have a significantly increased risk of refeeding syndrome, shifts in fluid and electrolytes that can lead to serious and possibly fatal clinical complications (Mehanna et al., 2008). These clinical complications include cardiac arrhythmias, cardiac failure, neuromuscular complications, oedema, and seizures (Mehanna et al., 2008). When refeeding patients at high risk of refeeding syndrome, refeeding must be gradual to avoid refeeding syndrome (Mehler & Krantz, 2003).

Purging, often done with the objective to control weight, is a type of compensatory behaviour prominent in BN and sometimes AN (American Psychiatric Association, 2022). Examples of purging include self-induced vomiting, laxative use, and diuretic use. Frequent purging is associated with fluid and electrolyte disturbances such as chronic dehydration, hyponatremia, hypokalaemia, and acid-base imbalances (Forney et al., 2016). In addition to this, self-induced vomiting is associated with medical complication including dental erosion (Conviser et al., 2014), gastroesophageal reflux (Kiss et al., 1989), parotid gland hyperplasia (Levin et al., 1980; Park et al., 2009), and Mallory-Weiss oesophageal tears in severe cases of forceful vomiting (Nitsch et al., 2021).

Laxatives are often used by individuals with EDs as a method of compensation. Examples of laxatives include bulking agents (e.g. adds bulk to a stool by retaining more water, making it softer and easy to pass), stool softeners, stimulant laxatives (e.g. stimulate contraction of bowel muscles) and osmotic laxatives (e.g. draws fluid into the intestine, speeding up bowel movement) (Forney et al., 2016). Overuse of laxatives can cause abdominal bloating and cramping, rectal prolapse, diarrhoea, haemorrhoids, and haematochezia (Malik et al., 1997; Xing & Soffer, 2001). Chronic overuse of stimulant laxatives can lead to cathartic colon, whereby colon motility is impaired and bowel dysfunction (Joo et al., 1998). Some individuals with EDs use diuretics to lower body weight by reducing water weight. Diuretics reduce electrolyte reabsorption, leading to increased water excretion (Forney et al., 2016). Overuse of diuretics can cause medical complications such as dehydration and electrolyte imbalances.

In some cases, individuals with EDs may use other medications to control their body weight. For example, diabetic patients can lose body weight by reducing their insulin medication, resulting in hyperglycaemia and osmotic diuresis (Wisting et al., 2013). Reducing insulin medication in insulin-dependent diabetic patients prevents glucose from entering cells to be used as an energy source, resulting in the excretion of excess glucose by urination. Hyperglycaemia can cause microvascular complications, and the increased urine output can lead to dehydration and electrolyte imbalances.

Although most medical complications of BN are primarily associated with purging behaviour, binge eating can lead to other serious health complications such as obesity and metabolic syndrome (Wassenaar et al., 2019). The bulimic eating pattern of fasting followed by binge eating may result in abdominal pain and bloating leading to gastric dilation (Mitchell, Pyle, & Miner, 1982).

While there is no diagnostic weight criterion for BN and BED, people with BN are associated with normal or above normal body weight (Fairburn, 1990; Masheb & White, 2012), while people with BED are associated with being overweight or obese (Dingemans & van Furth, 2012). However, individuals with BN or BED can be of normal or lower body weight as opposed to their associated weight status. Binge eating without compensatory behaviours over a long period of time, a characteristic of BED, is associated with diseases associated with overweightness and obesity (Wassenaar et al., 2019). Binge eating is suggested to be a primary indicator for non-obese individuals that leads to weight gain and obesity (Haiman & Devlin, 1999; Mussell et al., 1995; Reas & Grilo, 2007). In a study including 174 individuals with BED, 123 (71%) were classified as obese (having a BMI greater than 30) (Dingemans & van Furth, 2012). In a national epidemiological study in the US including 36,309 participants, Udo & Grilo (2019) found that individuals with BED had a mean of 2.3 chronic conditions compared to 1.4 among individuals without an ED. Additionally, 13.3% and 31.2% individuals with BED reported having diabetes and hypertension, respectively, compared with 9.3% and 25.0% among those without an ED.

Psychological consequences are another concerning feature of EDs mainly due to their effect on health and wellbeing. EDs often occur with other psychiatric disorders such as major depressive disorder, anxiety disorders, bipolar disorder, obsessive compulsive disorder, and substance use disorders (Hambleton et al., 2022). In Udo & Grilo's (2019) epidemiological study including 36309 participants, the lifetime prevalence of major depression among individuals with AN was 49.5%, 76.3% for BN, and 65.5% for BED. Lifetime prevalence of anxiety disorder among people with AN was 40.5%, 44.6% for BN, and 59.0% for BED. An epidemiological study in the US including 36171 participants, prevalence estimates of suicide attempts were 24.9% for those with AN, 31.4% for individuals with BN, and 22.9% for those with BED (Udo et al., 2019).

Jenkins et al.'s (2011) literature review of quality of life in individuals with EDs suggests that psychological associations may have a greater impact on quality of life than behavioural symptoms. For example, loss of control might be a more important indicator of quality of life than the frequency of the bingeing or than the amount of food consumed during a bingeing episode. Loss of control is often associated with psychological symptoms such as low self-esteem, anxiety, and body dissatisfaction (Morgan et al., 2002; Shomaker et al., 2010). Thus, the underlying psychopathology and an individual's subjective experience may be just as important, if not more important than behavioural symptoms. Overall, EDs have a significant effect on physiological and psychological health and wellbeing.

#### 2.1.4 Economic costs

With regards to economic costs, EDs are associated with increased health care costs and workplace costs. A systematic literature review of 18 studies from countries such as the United States, United Kingdom, Canada, Finland, and Germany, found that the annual costs of EDs ranged from \$1,288 to \$8,042 US dollars per patient (Stuhldreher et al., 2012). These costs include all medical expenditures (e.g. costs of inpatient and outpatient services, and pharmaceutical costs), non-medical costs (e.g. transportation and social services), and any out-of-pocket expenses not covered by insurance. Additionally, further costs were also suggested by indirect costs (e.g. losses of productivity due to sickness, to reduced productivity at the workplace, and to premature death) per patient to be \$4,455 US dollars for AN and \$1,528 US dollars for BN. In a literature review looking at the one-year costs of EDs in the US from a societal perspective, the economic costs (e.g. medical care, medical research, loss of workplace productivity, loss of wellbeing, loss of caregiver productivity, and premature mortality) of EDs in the US were estimated to be \$64.7 billion in fiscal year 2018 to 2019 (Streatfeild et al., 2021). Overall, the costs and outcomes of EDs pose a big threat to an individual's health, wellbeing, and social functioning.

### 2.1.5 Diagnostic descriptions of eating disorders

AN is characterised by a restriction of energy intake leading to significantly low body weight, an intense fear of gaining weight or becoming fat, disturbances in the way one's body weight or shape is experienced (American Psychiatric Association, 2022). BMI, calculated as  $\text{body weight}/\text{height}^2$ , is a common measure used to measure underweight status. The World Health Organization have employed the lower limit for normal body weight for adults as a BMI of  $18.5 \text{ kg/m}^2$  (World Health Organisation, n.d.). Individuals with BMIs greater than  $18.5 \text{ kg/m}^2$  are not underweight by population-based standards, and therefore should not be assigned to a diagnosis of AN. Within AN there are two subtypes: restricting and binge-eating/purging type, based on the presence of binge-eating or purging behaviour for the past three months.

BN is characterised by recurrent episodes of binge-eating, during which individuals experience a sense of lack of control regarding food consumption, followed by inappropriate compensatory behaviours, both occurring at least once a week for three months (American Psychiatric Association, 2022). These inappropriate compensatory behaviours include self-induced vomiting, excessive exercise, alternating periods of starvation also called fasting, and abuse of laxatives, diuretics or other medications. A binge-eating episode involves a subjective feeling of loss of control over eating and the amount of food consumed during a binge-eating episode is substantially larger than what most individuals would eat. Similar to AN, individuals with BN also display psychopathology of a fear of weight gain and being overweight, however individuals with BN typically have a normal or above normal body weight (between a BMI of  $18.5$  and  $30 \text{ kg/m}^2$ ).

BED is characterized by recurrent episodes of binge eating at least once a week for three months (American Psychiatric Association, 2022). Binge-eating episodes are associated with three or more of the following: eating until uncomfortably full, eating more rapidly than normal, eating large amounts of food when not feeling physically hungry, eating alone because of embarrassment about how much one is eating, and feeling disgusted with oneself, depressed, or very guilty afterward. Binge eating without inappropriate compensatory behaviours is a distinguishing feature of BED. Individuals with BED often are overweight or obese. Although BED does not have an underlying psychopathology of fear of weight gain or distorted body image, feelings of regret and shame associated with overeating may indirectly contribute to loss of control during a binge-eating episode, protracting a similar cyclical pattern found in BN.

OSFED encompasses EDs that do not meet the full diagnostic criteria for AN, BN, or BED, and are associated with greater variability in symptomatology (American Psychiatric Association, 2022). These disorders may be described as subthreshold disorders or partial syndromes. The five OSFED disorders include Atypical anorexia nervosa, Bulimia nervosa (of low frequency and/or limited duration), Binge-eating disorder (of low frequency and/or limited duration), Purging disorder,

and Night eating syndrome. OSFED was previously known as Eating Disorder Not Otherwise Specified (EDNOS) in the DSM-4 (American Psychiatric Association, 1994), and BED was included in as a category of EDNOS. Atypical AN has the exact same fears and behaviours, but weight remains within or above normal range. BN and BED of low frequency and/or limited duration have binge-purge cycles but occurs less than once a week and/or for less than three months. AN, BN, BED, and these disorders' OSFED counterparts have underlying psychopathology of distorted body image or self-image. Although purging disorder and night eating syndrome are both categories of OSFED, purging disorder does not include eating behaviour symptomatology. While night eating syndrome does not include underlying psychopathology the other disorders have.

#### 2.1.6 Dietary restraint

Restrictive eating behaviours such as dieting and fasting are ubiquitous features of EDs. Dieting or other restrictive changes in food choices can initiate the onset of the AN. Idiosyncratic eating behaviours that occur most often in individuals with AN are excessively inadequate energy intake, vegetarianism, avoidance of red meats, and excessive intake of or avoidance of sweets and desserts (Huse & Lucas, 1984). Much like AN, the onset of BN is commonly triggered following a period of dieting or restrictive eating (Kirkley, 1986). Body dissatisfaction, negative affect, and low self-esteem were found to be reliable predictors of later onset of BN (Burton & Abbott, 2017).

When discussing eating behaviours in the context of EDs, specific foods are commonly cognitively categorised as “good” and “bad” foods, or even “safe” and “forbidden”. The most frequent characteristics of food associated with danger being high calories, high fat, and high sugar (Sunday et al., 1992). With individuals with BN, “forbidden foods” or foods that trigger binge-eating are usually high in fat content, whereas “safe foods” are usually low in fat content and are eaten during non-binge meals and snacks (Hetherington et al., 1994; Kales, 1990). These perceptions and cognitions about food are the major determinants of food choices and reveals the kinds of foods are avoided or desired by individuals with EDs. These eating behaviours that contribute to the development of EDs are addressed by ED treatment guidelines.

#### 2.1.7 Body image

Negative conceptualisations of body image, or body dissatisfaction, occurs with regards to an elevated focus on appearance. In females, this usually manifests as weight and shape concerns, while for men this usually occurs as concerns with leanness and muscle mass (Grogan, 2021; Silberstein et al., 1988). Purging and compensatory behaviours seen in AN and BN are often triggered as a coping mechanism or as a response to discontentment to body weight or shape, or to adverse life events (Garner, 1993). A study exploring the risk factors for future onset of EDs in adolescent females reported that body dissatisfaction and unhealthy weight control behaviours are

among the most potent risk factors for purging/binge eating spectrum EDs (Stice et al., 2017). Therefore, body dissatisfaction may be one of the primary motivations that drive unhealthy weight control behaviours and disordered eating behaviours.

## 2.2 Current studies around eating in EDs

There are only a small number of studies that have looked at dietary intake and eating behaviours of those recovered from an ED, and currently, there are no systematic literature reviews synthesising this research together. The majority of these studies that do look at dietary intake or eating behaviours look at individuals post ED treatment with a weight-restoration focus (Pettersson et al., 2021; Schebendach et al., 2011) or at risk of EDs (Aparicio-Llopis et al., 2014). However, those with who have complete ED treatment are not necessarily recovered from EDs. For example, while low body weight is a major feature and diagnostic criterion of AN, studies report relapse rates of 41% to 52% within one year of discharge from ED treatment programs even after weight restoration (Carter et al., 2012; Khalsa et al., 2017). McMaster et al. (2021) reported that weight restored AN patients continue to have a narrow range of food choices, restricted dietary intake, as well as nutritional deficiencies. Furthermore, a study found that quality of life in individuals recovered from EDs was still worse than healthy controls, indicating that residual effects of EDs had occurred despite recovery of symptoms (De la Rie et al., 2005). Due to the lack of literature on individuals recovered from EDs, exploring the findings on people with active EDs may be helpful with identifying dietary patterns and eating behaviours that require more attention in recovered individuals.

### 2.2.1 Review on what ED patients eat

In Jenkins et al.'s (2024) systematic review summarising energy intake, macronutrient and micronutrient intake in those with EDs, individuals with AN consumed the least amount of energy, and every AN sample had a mean energy, carbohydrate, and fat intake below the RDI (Recommended Daily Intake) (Public Health England, 2016). This supported the finding of low dietary intake and may explain the malnutrition found in AN (Lloyd et al., 2021; Marzola et al., 2013; Schebendach et al., 2019). Low fat intake can lead to numerous adverse health outcomes due to the energy dense profile of fats and the consequences of lipid depletion (Duerksen & McCurdy, 2005). Individuals with active EDs consistently reported to avoid carbohydrates and energy-dense foods (Segura-García et al., 2014). Individuals with BN had the some of the highest reported energy intakes, and this supports the findings of a review looking at the energy intake of binge eating episodes (Mourilhe et al., 2021). This supports the theory that dieting and compensatory behaviours such as purging serve to increase overall calorie intake (Fairburn et al., 2003), whereby continued compensation reinforces further binge eating often leading to 'vicious cycles'. Individuals with BN generally consumed carbohydrates, fat, and protein higher than the RDI. Individuals with BED consumed energy, fat, and protein higher than the RDI, while

carbohydrate intake was similar to the RDI. This supports the finding that there are some differences in dietary intake and/or eating behaviour between individuals with BED and BN (Walsh & Boudreau, 2003). Whilst increased carbohydrate and fat intake during binge episodes has been well-documented (Presseller et al., 2023), the finding that overall protein intake was high relative to the RDI was unexpected. Overall, macronutrient intake in individuals with active EDs reflect the dietary intake patterns according to the compensatory or binge eating behaviours specific to the afflicted ED.

Among the 11 studies that reported micronutrient intake within the systematic review, Jenkins et al. (2024) reported low intakes of calcium, vitamin D, and zinc compared to the RDI. Low levels of calcium intake were found in individuals with AN. Low calcium intake can result in low bone density (Misra et al., 2006) and increased fracture risk (Fazeli & Klibanski, 2014). Intake of vitamin D, an essential micronutrient for calcium absorption, was low in all individuals with an ED relative to the RDI. This supports the recommendation that Vitamin D deficiency needs to be addressed when recovering from an ED as this deficiency can occur across different types of EDs (Velickovic et al., 2013), irrespective if the individual has low body weight. Low calcium and vitamin D intake is associated with low dairy intake, thus indicating individuals with active EDs have low consumption of dairy products. Low levels of zinc were found in individuals with ED (Chiurazzi et al., 2017; Patsalos et al., 2021). Common symptoms of zinc deficiency are coincidentally similar to symptoms of AN which include decreased taste and smell, decreased appetite, food avoidance, impaired digestion and absorption, and depression (Leach et al., 2025). Thus, zinc deficiency has been suggested as a sustaining factor for EDs (McClain et al., 1992) and could be indicative of high relapse rates in severe ED (Leach et al., 2025). On the whole, the micronutrient intake data suggests important micronutrient treatment targets in individuals with active EDs include calcium, vitamin D, and zinc.

### 2.2.2 Vegetarian dietary patterns in those with EDs

Vegetarian and vegan diet patterns, such as the high consumption of fruits and vegetables and the restriction of meat products, are common among those with a history of EDs. Studies have shown that among patients with AN, about 50% follow a vegetarian diet (Kadambari et al., 1986; O'Connor et al., 1987), compared to about 9 to 34% of women in the general population (Gilbody et al., 1999; Nezlek & Forestell, 2024). Studies have also shown that more non-recovered AN patients than recovered AN patients were vegetarian, and that vegetarianism was still prominent in individuals recovered from AN (Hart et al., 2018). Recovered individuals who ate a vegetarian type of diet was significantly more likely to also eat restrictively or diet. This restrictive nature could potentially interfere with a patient's ability to gain weight.

With regards to micronutrients, individuals with AN who followed a vegan diet during their hospital stay had inadequate Vitamin D intake (Hart et al., 2018). Vitamin A, which includes carotene and retinol, is commonly found in many fruits and vegetables (Setnick, 2010). Due to this, individuals who follow a vegetarian or vegan diet are likely to consume larger amounts of vitamin A compared to the general population. Because it is unclear how a strict diet would impact recovery from a nutritional and psychological standpoint, a vegan meal pattern during the treatment of EDs is not recommended (Hart et al., 2018). Further research is required to assess the feasibility of vegan meal patterns in the overall treatment and recovery process.

### 2.2.3 Common micronutrient deficiencies of ED patients

In addition to restrictive dietary patterns, previous literature has highlighted various micronutrient deficiencies that are prevalent in individuals with active EDs. Individuals with EDs that have limited dairy intake are likely to have inadequate calcium intake (Miller et al., 2001). Because calcium is leached from bone to keep serum calcium levels stable, poor bone density is an indicator of long-term calcium deficiency. Due to the large amount of evidence of bone loss in individuals with AN (Mehler & MacKenzie, 2009; Misra, 2008), another frequently discussed micronutrient alongside calcium is vitamin D. Inadequate vitamin D intake is common among ED patients who have low dairy intake (Hadigan et al., 2000). Although calcium and vitamin D are important contributors to developing bone density, a systematic review found that calcium and vitamin D intake are not major contributing factors for bone mineral content restoration among individuals with AN (Mehler & MacKenzie, 2009). A systematic review gathered evidence that weight gain significantly increases bone mineral density in adolescents with AN (El Ghoch et al., 2016). Studies have shown individuals with AN to have inadequate intakes of iron (Hanachi et al., 2019; Lobera & Rios, 2009). This inadequate intake of iron may be due to a lower intake of meat and meat products, as a high prevalence of individuals with EDs follow a vegetarian or vegan diet. Symptoms of iron deficiency also coincide with symptoms of energy malnutrition which include general fatigue, weakness, and the inability to stay warm (Setnick, 2010). In addition to iron, studies have shown individuals with AN to have inadequate intakes of zinc (Hadigan et al., 2000; Hanachi et al., 2019; Lobera & Rios, 2009). Low dietary intake, restriction of meat, and heavy exercise can contribute to zinc deficiency (Setnick, 2010). Zinc deficiency can inhibit an underweight person's ability to gain weight and muscle, which is detrimental during recovery from EDs (Nagata et al., 2022). Thiamine, or vitamin B1, is widely found in food, but individuals with EDs who restrict carbohydrate intake may have thiamine deficiency (Setnick, 2010). A systematic review (O'Brien et al., 2025) measuring the prevalence of thiamine deficiency in individuals with AN found mixed results of prevalence rates varying from 0% to 56.7%. Thiamine deficiency may account for psychiatric symptoms, including deterioration in mood and depression (Winston et al., 2000). Overall, the common micronutrient deficiencies found in individuals with active EDs are calcium, vitamin D,

iron, zinc, and thiamine. We expect recovered individuals to have similar, if not the same, micronutrient deficiencies.

#### 2.2.4 Lack of consistency and validity of ED treatment manuals.

With regards to addressing unhealthy eating behaviours and nutritional deficiencies, ED treatment guidelines outline recommendations for clinicians, health professionals, and patients. However, a large majority of ED treatment manuals provide unsuitable nutrition advice and recommendations. A narrative review analysing the nutrition information of 22 ED treatment manuals found that only 73% included nutrition education content, while 9% treatment manuals did not include any nutrition or food-related content (McMaster et al., 2021). Furthermore, McMaster et al., (2021) found that only two (9%) of the 22 treatment manuals were co-authored by a dietitian, and only six (27%) cited dietetic literature. This suggests that non-dietitian clinicians and less experienced dietitians are likely to follow unreliable sources of nutrition information. And, since many ED clinicians often do not have a clear understanding of the dietitian's role in ED treatment and their necessity in the process of ED recovery (McMaster et al., 2021), nutritional management is still often given by clinicians who do not have specialised training in nutrition.

Treatment guidelines recommended the same nutritional advice for the general population to the people with EDs, despite being designed for the prevention of an overweight population and reduction in diet-related diseases. Out of the 22 treatment manuals, 14 (64%) included nutrition advice that referenced dietary guidelines meant for the general population. Although individuals with EDs need ED specific recommendations (Hart et al., 2018), treatment guidelines designed for the general population are often adapted for nutrition education in ED treatment. For example, recommending reduced-fat dairy products for patients with AN or BN, or recommending low glycaemic index carbohydrates to prevent binge eating. Recommendations like choosing low-fat dairy products, limiting fats and oils, and increasing fruit and vegetable intake are not appropriate suggestions for individuals with EDs and may reinforce unhelpful eating behaviours such as avoiding foods high in fat content.

In addition to a large majority of nutrition advice being sourced from inappropriate material, most nutrition advice in ED treatment manuals are not evidence-based recommendations. Thirteen (60%) of the treatment manuals provided nutrition recommendations not backed by literature. Recommendations included food choices not consistent with current descriptions of dietetic practice or dietary advice for which no research currently exists. Although these recommendations may be based on the respective authors' expert opinion and clinical experience, no indications of this were made in any of the manuals. This room for ambiguity resulting in recommendations guided by expert opinion rather than evidence-based practice indicates that non-dietitians following these treatment guidelines are likely to make ill-informed nutrition recommendations.

Although there are descriptions of dietetic clinical practice regarding weight restoration, meal planning, and the cognitive aspects of EDs (Mittnacht & Bulik, 2015), there is no baseline for standardised dietetic practice. This is mostly an issue because access to experienced clinicians specialised in EDs is also lacking (McMaster et al., 2021), and as a result inexperienced dietitians provide inappropriate nutrition advice. Overall, inconsistent dietitian involvement, the lack of inappropriate nutrition information in treatment manuals, and the lack of standardised dietetic practice mean that nutrition information given to ED patients is highly variable. Thus, resulting in individuals receiving ED treatment to practice various eating behaviours.

### 2.3 Practice guidelines in ED treatment

Previous guidelines have recommended therapeutic goals which mainly focused on reducing or eliminating ED symptoms (American Dietetic Association, 2006; Hay et al., 2014). However, in recent years, there is a growing recognition that the goal is to work collaboratively with patients through their recovery journey, helping patients gain symptom relief, maintain symptom stability, and enhance their quality of life (e.g. skills enrichment, feelings of confidence, and personal triumphs) (Hay et al., 2014; Stewart & Williamson, 2004).

Family based treatment (FBT) is one of the first-line treatments for EDs and refers to an evidence-based psychological treatment method for adolescents with EDs (Lock, 2011; Sterling et al., 2019). FBT consists of approximately 10 to 20 sessions carried out over the course of 6 to 12 months. The first phase focuses on giving parents complete oversight and management of food intake for weight restoration and nutritional rehabilitation of the child. The second phase is the gradual process of giving some control of food selection and eating back to the child. However, primary caregivers are asked to take complete control again if the child's attempt to feed themselves leads to weight loss or medical complications. The third phase focusses on addressing the obstacles and issues which may have been on hold during the time of illness and treatment are addressed, giving the child more control in food selection and consumption, and developing relapse prevention.

Methods of nutrient delivery for weight restoration and nutrition rehabilitation commonly used alongside FBT include, but are not limited to, food exchanges, counting calories, the rule of threes, and the plate-by-plate approach (Sterling et al., 2019). Food exchanges are based on the diabetic exchange system (Wheeler et al., 2008), while counting calories is a method where primary caregivers with track the child's calories throughout the day. The Rule of Threes (Herrin, 2012) requires consumers to eat three meals and up to three snacks a day, allowing no more than 3 hours between meals. The Plate-by-plate approach, a visual approach adapted from the MyPlate approach (US Department of Agriculture, n.d.), is where each meal is portioned to reflect 50% grains/starches, 25% protein, 25% vegetables/fruits, as well as dairy and fats. For someone who does not need to gain weight (e.g. an individual with BN who might be of normal weight), Sterling

et al. (2019) recommends to portion each meal to reflect 33% grains/starches, 33% protein, and 33% vegetables/fruit, along with dairy and fats.

The plate-by-plate approach has a checklist to guide primary caregivers and consumers. These include: using a 10 inch (25.4 cm) plate for serving an appropriate amount of food; plating all the food groups (e.g. grains/starches, protein, vegetables/fruits, fats, and dairy); filling the entire plate with no empty spaces; setting the number of meals and snacks per day (three meals plus two or three snacks per day is usually recommended); choosing a variety of foods including foods the child usually avoids; and considering if the meal makes sense or whether the foods should go together (e.g. a meal consisting of rice, chicken, oranges, and milk should not be served).

One of the first-line treatments for EDs, cognitive behavioural therapy (CBT), addresses beliefs about body shape and weight and disordered eating behaviours (Murphy et al., 2010). CBT is widely accepted as the psychological treatment of choice for BN and BED (Heruc, Hart, et al., 2020; Murphy et al., 2010). Dieting and rigid dietary rules are central features of EDs, and a major goal of CBT is to address these eating behaviours which impair quality of life (Heruc, Hart, et al., 2020). One of the aims of CBT is to establish a pattern of regular eating (Murphy et al., 2010). Murphy et al. (2010) suggest that establishing a pattern of regular eating is essential for successful ED treatment as it addresses dieting, displaces most episodes of binge eating, and is the primary method for refeeding for underweight patients. Similarly to the plate-by-plate approach, a pattern of regular eating consists of three meals along with two or three snacks per day, ensuring there is not a 4-hour interval between bouts of eating. Although the eating pattern should be contained to its planned structure, it should be flexible enough to allow adjustment of meal timings to suit the patient's commitments. CBT addresses rigid dietary rules by first identifying the patient's various dietary rules and the beliefs behind them. In order to break these dietary rules, these beliefs are tested by helping the patient learn that feared consequences upholding these rigid rules (e.g. weight gain or binge eating) are not inevitable outcomes. CBT-T is a relatively new approach to CBT where the whole treatment process takes 10 sessions instead of the usual 20 to 30 sessions (Waller et al., 2019). The Recovery from Eating Disorders for Life (REAL) Food Guide (Hart et al., 2018) is a nutrition guideline used as a part of CBT-T.

The REAL Food Guide is a nutrition education guide tailored to help educate ED clinicians and patients about consuming a balanced, healthy diet (Hart et al., 2018; Sterling et al., 2019). The REAL Food Guide was specifically designed for individuals with EDs including nutrition information addressing nutritional requirements and common problems observed in people with EDs. Whether individuals need to gain or maintain weight, nutritional requirements can be met by following the recommended number of serves and standardised portion sizes for each food group. The food groups are categorised by the frequency of how much an individual is recommended to consume.

Core foods, also called everyday foods, consists of vegetables, fruit, calcium foods, protein, and carbohydrates including water. Individuals with EDs are recommended to have two serves of fruit and five serves of vegetables daily, the same amount recommended in community guidelines. However, Hart et al. (2018) recommends to not exceed these amounts because excessive vegetable and fruit intake is commonly observed in ED individuals (Rock & Yager, 1987). While individuals with EDs are often seen avoiding carbohydrates (Segura-García et al., 2014), and whole dairy foods (Forbush & Hunt, 2014; Mayer et al., 2012; Misra et al., 2006), the REAL Food Guide recommends eating the adequate amounts every day. The guide encourages intake of both animal and vegetarian sources of protein, as vegetarianism and veganism are commonly practiced among individuals with EDs (Kadambari et al., 1986; O'Connor et al., 1987). The guide has included water as part of the core foods group and highlights the importance of adequate hydration as a part of nutritional requirements. The REAL Food Guide includes nuts, fats, and oils as foods to have some every day. Hart et al. (2018) highlights the importance of adequate amounts of dietary fats and oils every day for adequate intake of fat soluble vitamins A, D, E, K (Liu et al., 2017). Studies have found individuals with EDs to have low intake vitamins A, D and E (Chiurazzi et al., 2017; Santiago et al., 2019; Velickovic et al., 2013), and have deficiencies in essential fatty acids (Allen et al., 2013; Misra et al., 2006; Swenne & Rosling, 2012). For underweight individuals with AN, it is difficult to meet energy requirements for weight restoration when omitting foods containing fats and oils. The REAL Food Guide omits the message of choosing reduced fat products, a message commonly seen in eating guidelines for the general population (Ministry of Health, 2020; National Health and Medical Research Council, n.d.).

The REAL Food Guide recommends practicing making anxiety-provoking choices by including “Fun Foods” every day and eating out socially. “Fun foods” includes foods consumed when eating out, during celebrations, and as snacks, and are often foods with high calorie content. This recommendation addresses the avoidance of eating socially and avoidance of specific foods, both of which are central features of EDs. Individuals with ED often avoid eating with others as these social occasions are anxiety-provoking (Treasure et al., 2012), leading to them eating alone which results in further social isolation. Treasure et al. (2012) suggests that poor socioemotional functioning and social isolation is a universal feature of EDs, while also serving as a perpetuating factor for AN. The guide recommends repeated exposure to feared eating situations, helping individuals build tolerance and disprove distorted beliefs about the feared consequences (Steinglass et al., 2012). Those with EDs might only be comfortable with a small selection of foods they may consider “safe” or “good”, while avoiding foods they consider “forbidden” or “bad”. Similar to how CBT addresses rigid dietary rules, these “Fun foods” are recommended to be included daily to challenge consumer’s beliefs about eating these foods as repeated exposure to an avoided food helps the individual to become desensitised to it over time. The REAL Food Guide asks individuals with EDs to be cautious with diet food and fillers because excess intake of these foods may

contribute to feelings of overfullness, leading to difficulty in meeting nutritional requirements achieved through adequate intake of the core food groups. Individuals with EDs often use low energy foods including caffeinated beverages and diet soft drinks (Brown & Keel, 2013), artificial sweeteners (Schebendach et al., 2017) to reduce hunger and suppress appetite (Forbush & Hunt, 2014; Hart et al., 2011; Rock & Yager, 1987).

The American Dietetic Association's (2006) position statement recommends developing a pattern of normal eating to replace disordered eating behaviours. A pattern of "normal eating" is described as having three meals per day with appropriate snacks in between. This normal pattern of eating reintroduces the individual to their internal hunger and satiety cues while also changing behaviours to move away from restriction and the binge-purge cycle. The American Dietetic Association (2006) also recommend that energy intake should be based on the weight maintenance because hunger from too much of an energy restriction can be a trigger for binge-eating. One strategy that is recommended is to use goal setting to set individualised targets the patient can appropriately achieve. This may include the gradual incorporation of binge foods or "forbidden" foods into the individual's diet, or going grocery shopping without buying more food than what they planned for or how much they usually eat.

Combined psychological and dietetic intervention is highlighted as an essential component of ED treatment (Heruc, Hart, et al., 2020; Heruc, Hurst, et al., 2020; McMaster et al., 2021; Ozier & Henry, 2011). During ED treatment, all clinicians involved should have an awareness of evidence-based psychological therapy (Heruc, Hart, et al., 2020). For a dietitian, this means they must understand and complement evidence-based psychotherapy with dietetic care to fulfil their role as part of the multidisciplinary team (Heruc, Hart, et al., 2020). The Australia & New Zealand Academy for Eating Disorders (ANZAED) guidelines recommend dietitians to target eating behaviours that minimise the exclusion of any foods, and support eating flexibility and normalised eating patterns. However, the ANZAED guidelines do not describe the specifics of what these recommendations mean and only suggest increasing or decreasing something. For example, the guidelines do not explicitly state how exactly one should incorporate previously avoided or feared foods. In contrast, the REAL Food Guide, a guideline specifically made for ED patients, recommends all recovering individuals to consume one serving of "fun foods" to adhere to this recommendation. Additionally, the REAL Food Guide (Hart et al., 2018) states that ED guidelines should be tailored specifically for the ED population because people with EDs have different needs compared to the general population. The REAL Food Guide compares their dietary recommendations against the guidelines made for the general population, suggesting that individuals recovered from EDs have different characteristics and needs compared to the general population. Furthermore, the ANZAED, FBT, and CBT guidelines do not state the goal of these eating recommendations. For example, if the

overall aim of these recommendations is for individuals with EDs is to consume a diet akin to that of the general population, healthy eating guidelines, or something entirely different.

## 2.4 Role of dietitians in ED treatment

Although consulting with dietitians has not been historically recommended by ED treatment guidelines (Sterling et al., 2019), current clinical practice guidelines recommend dietetic counselling from a registered dietitian as a part of multidisciplinary treatment for individuals with EDs (Hay et al., 2014; Heruc, Hart, et al., 2020; Heruc, Hurst, et al., 2020). Dietitians are health professionals with special training in nutrition and are qualified to provide medical nutrition therapy for the normalisation of nutritional status and eating behaviour (American Dietetic Association, 2006). In an integrative review of 14 studies exploring the role of dietitians in the treatment of EDs, Heafala et al. (2021) describes the role of dietitians as providing medical nutrition therapy for stabilisation and recovery, tailored to the patient's stage of change and level of motivation.

In 2020, the ANZAED developed ED guidelines defining essential treatment principles and clinical practice standards for mental health and dietetic professionals (Heruc, Hurst, et al., 2020), as well as key practice and training standards for dietitians providing treatment to individuals with EDs (Heruc, Hart, et al., 2020). For treatment of EDs, the ANZAED guidelines (Heruc, Hart, et al., 2020) recommend dietitians to implement dietetic care which includes identifying, planning, and implementing nutrition interventions. Nutrition interventions include nutrition education (e.g. energy and nutrient needs, consequences of energy and nutrient deficiency, appetite cues, eating socially, and shopping and cooking skills) and nutrition counselling (e.g. monitoring of eating behaviour, beliefs and attitudes about food and health, and addressing barriers to behaviour change).

Yang et al.'s (2023) literature review of a total of 15 studies, explored the role and value of a dietitian in ED treatment from the perspective of individuals with lived experience. The review found that the role of a dietitian emerged into three themes: providing nutrition knowledge and skills; being a crucial part of a multidisciplinary team; and providing person-centred dietetic treatment. Dietitians provide nutrition education and increase nutrition knowledge to shift their relationship with food, eating for well-being and caring for their body. Dietitians have a role that is not limited only to providing nutrition treatment but also engaging with clients by centering on the individual's needs and preferences. The author found that going beyond a weight-centric focus by using a patient-centered approach and prioritising the individual's sense of autonomy and competence was integral to positive treatment outcomes (Yang et al., 2023). One of the roles of a dietitian is to provide stabilisation and recovery through medical nutrition therapy (Heafala et al., 2021), however the margins of what constitutes as recovery from an ED is currently not defined (Bachner-Melman et al., 2018). Overall, ED researchers and clinicians suggest that dietitians are a crucial part of multidisciplinary treatment for EDs.

## 2.5 Definition of recovery from EDs

One major limitation across ED literature is the variety of definitions of recovery. The lack of a standardised definition of recovery results in high heterogeneity and difficulty of direct comparison between studies using different definitions. Although our review will not define ED recovery, a narrative synthesis will be used to include all relevant studies regardless of recovery definitions. Currently, there is significant disagreement in the ED field regarding the definition of recovery and what constitutes as recovery (Dawson et al., 2015; Bardone-Cone et al., 2018). Researchers often use definitions exclusive to their study, thus hindering the ability to compare findings and combine data across studies (Bardone-Cone et al., 2010; Bardone-Cone et al., 2018; Hower et al., 2022). Depending on the definition criteria, individuals may only be considered partially recovered or not recovered at all. Another downside of the lack of a standardised definition of recovery is the huge variation in recovery rates. Couturier and Lock (2006) found that recovery rates varied between 57 and 94% depending on the definition used.

Some studies have defined recovery using only the physical and behavioural indices (Bang et al., 2016; Ely et al., 2016; Shott et al., 2016). Excluding psychological criteria from the definition of recovery may result in studies where participants may seem recovered through visible indicators (e.g. weight and behaviour) but have not recovered psychologically (Keski-Rahkonen & Tozzi, 2005). For example, if someone with BN reduces the number of binge episodes from once a week for to once every two weeks, meaning they do not qualify for BN anymore, the individual may still experience the same degree of poor quality of life due to other detrimental behaviours. Only looking at the absence of prominent ED behaviours neglects more subtle forms of disordered eating that may not be compatible with full recovery. This is supported by De la Rie et al.'s (2005) finding that quality of life in recovered individuals remained poorer than healthy controls, indicating that residual effects of EDs may persist even after recovery. While some studies go beyond physical and behavioural symptoms and use a psychological criterion. For example, studies have assessed weight and shape concern with the Eating Disorders Examination-Questionnaire (EDE-Q) (Berg et al., 2012), and with Psychiatric Status Ratings (PSR) (Herzog et al., 1993; Murray et al., 2017).

### 2.5.1 EDE-Q as a definition of recovery

The EDE-Q (Fairburn & Beglin, 1994, 2008) is a 28-item, self-report questionnaire that measures clinical criteria for EDs and assesses attitudes, feelings, and behaviours related to eating and body image over the past 28-days. Most commonly used among researchers and clinicians, the EDE-Q is used to obtain descriptive information regarding ED symptoms and make ED diagnoses. Often used to validate other assessments of ED diagnosis, the EDE-Q is considered the gold standard of ED assessment (Grilo et al., 2001; Reas et al., 2006). Each item is scored with a 7-point rating scale (0-6) where scores of four or higher indicate clinical range. The 28 items are categorised into

subscales of dietary restraint, eating concern, shape concern, and weight concern, and to obtain subscale scores, the scores for the corresponding items are added together and the sum divided by the total number of items forming the subscale. An overall score, also called global score, is obtained by adding together the four subscale scores divided by four.

The eating concern subscale consists of items regarding preoccupation with food, eating or calories, fear of losing control overeating, eating in secret, avoidance of social eating, and guilt about eating. The shape concern subscale consists of preoccupation with shape or weight, fear of weight gain, feelings of fatness, importance of shape on self-image, dissatisfaction with shape, discomfort seeing one's body, and discomfort with others seeing one's body. The weight concern subscale consists of items regarding preoccupation with shape or weight, desire to lose weight, importance of weight on self-image, reaction to prescribed weighing, and dissatisfaction with weight. The dietary restraint subscale consists of items regarding limiting of food intake, avoidance of eating for long periods of time (fasting), avoidance of specific foods, dietary rules, and the desire for an empty stomach. While most of the items are measures of psychological symptoms of EDs, four of the five items in the dietary restraint subscale measures behavioural symptoms of EDs. Except for the item regarding the desire to have an empty stomach, the remaining items in the dietary restraint subscale provides descriptive information regarding more subtle, but still distinct to EDs, behaviours outside prominent clinical ED symptoms of purging, restrictive eating, binge eating. Using a 7-point scale, the restraint subscale measures frequency of food limiting, long periods of no eating, exclusion of any foods, and following dietary rules during the past four weeks. Items with scores of zero mean no days, scores of one mean 1-5 days, scores of two mean 6-12 days, scores of three mean 13-15 days, scores of four mean 16-22 days, scores of five mean 23-27 days, and scores of six mean every day. Therefore, studies that use EDE-Q scores have described, to some extent, the eating behaviours of individuals recovered from EDs through the dietary restraint items describing food intake restriction, fasting, avoidance of specific foods and dietary rules.

### 2.5.2 Personal or subjective definition of recovery

There are studies that expand even further objective symptomatic recovery and focus on personal components of recovery. The "recovery model", in the context of EDs (Dawson et al., 2014), is a holistic, person-centered approach to recovery that emphasizes personal attitudes, values, feelings, goals, and the limitations caused by illness. This model recognises individuals as experts in their own recovery, and that recovery is an ongoing process that is constantly changing (Wetzler et al., 2020). Some individuals who are considered clinically recovered from EDs will say they will always be in recovery. Based on their review identifying fundamental criteria for ED recovery according to recovered individuals, de Vos et al. (2017) proposed a new definition for recovery: "recovery from an ED is the ability to adapt and to self-manage in the face of social, physical and

emotional challenges with an overall tendency towards growth in psychological well-being and adequate symptom remission". This definition of recovery is in line with the recommendation to provide ED treatment through holistic approach, tailored to the patient (Heafala et al., 2021). Many qualitative studies use a subjective, patient-reported definition of recovery (Romano & Ebener, 2019; van Bree et al., 2023). Subjective recovery as a measure of recovery may be useful in revealing growth in psychological well-being and self-image, because the individuals themselves are likely to have a personal understanding of the difference in dietary patterns and cognitions before and after recovery. For the purpose of this literature review, the definition of recovery is a crucial study characteristic to consider when comparing findings between studies.

## 2.6 Summary

EDs pose a serious public health problem, boasting a high prevalence among the general population, increased risk of mortality, and poor quality of life due to comorbidities associated with EDs. Previous literature has defined recovery from EDs through physical, psychological, and/or behavioural criteria (Bardone-Cone et al., 2010; Bardone-Cone et al., 2018; de Vos et al., 2017). However, the behavioural criteria in ED studies rarely includes disordered eating behaviours outside of binge eating, purging, and fasting. ED treatment guidelines have nutrition recommendations that aim for the elimination of disordered eating behaviours (Heruc, Hart, et al., 2020; Lock, 2011; Murphy et al., 2010; Sterling et al., 2019). Examples of these behaviours include the avoidance of specific foods, rigid food rules, and avoidance of eating in the presence of others. This suggests that studies which do not include less commonly studied eating-related behaviours examine recovered individuals through an incomplete lens.

Currently, there are only a few studies examining the dietary intake and eating behaviours of those recovered from EDs. There is also no literature review synthesising this data in individuals recovered from EDs. The purpose of our literature review and narrative synthesis is to gather the findings on dietary intake and eating behaviour of those recovered from EDs. Examining dietary patterns and eating behaviours will help provide clinicians and researchers a more complete description of the behaviours of individuals recovered from EDs.

## **Chapter 3: What and how people recovered from eating disorders eat: a systematic review and narrative synthesis.**

### **3.1 Abstract**

**Background:** Currently, there is a lack of research on dietary intake and eating behaviour in individuals recovered from eating disorders (EDs). There is no literature review synthesising this data, so what and how an individual recovered from EDs eats remain unclear.

**Aim:** The aim of this study is to describe the dietary intake and eating behaviour in individuals recovered from EDs.

**Methods:** A systematic literature review was conducted in accordance with the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) statement guidelines. Five electronic databases were searched with no restriction on study dates and study design. Included studies reported data on the dietary intake and eating behaviour of recovered individuals. Results of the literature review were described using a narrative synthesis. The Mixed Methods Appraisal Tool was used for quality appraisal. Details of the protocol for this systematic review was registered on PROSPERO (International Prospective Register for Systemic Reviews, Registration Number: CRD420250605506).

**Results:** Out of a total of 21,864 records, 20 studies met eligibility criteria. Individuals recovered from EDs had low energy and fat intake compared to the general population. Individuals recovered from EDs were implied to have higher intake of fruits and vegetables, and lower intake of dairy and meat compared to the general population. With regards to eating behaviour, individuals recovered from EDs had at least three meals a day and included the intake of previously avoided or restricted foods.

**Conclusion:** This study examined the dietary intake and eating behaviour in individuals recovered from EDs. Overall, individuals recovered from EDs had persistence of common restrictive eating patterns, albeit with less severity compared to individuals with active EDs. More research assessing nutrient intake in individuals recovered from EDs is needed.

### **3.2 Introduction**

Eating Disorders (EDs) are psychological conditions associated with significant physiological and psychological complications (American Psychiatric Association, 2022), and these disorders have become a huge public health problem. EDs are estimated to affect 8.4% of females and 2.2% of males at any point in their lifetime (Galmiche et al., 2019). EDs have the highest mortality rate out

of all psychiatric disorders (Miskovic-Wheatley et al., 2023), whereby AN, BN, and EDNOS has 5.21, 2.51, and 2.20 increased risk of mortality, respectively (Krug et al., 2025). A surveying study estimated the economic costs of EDs in the US to be \$64.7 billion in a single year (Streatfeild et al., 2021).

Previous studies have defined recovery from EDs through physical, psychological, and behavioural indices (Bardone-Cone et al., 2010; Bardone-Cone et al., 2018; de Vos et al., 2017). Physical criteria usually include body mass index (BMI) and regularity of menses (Franko et al., 2018; Mustelin et al., 2016; Pfuhl et al., 2016). While behavioural criteria are based on the absence of bingeing, purging, and fasting (Bang et al., 2017; Bentz et al., 2017; Eddy et al., 2017). Psychological criteria often include psychometric scores assessing body image, weight concerns, and relationship with food (Castellini et al., 2018; Halvorsen et al., 2018; Scaife et al., 2017). ED treatment guidelines strongly endorse the elimination of disordered eating behaviours (Heruc, Hart, et al., 2020; Lock, 2011; Murphy et al., 2010; Sterling et al., 2019), however studies rarely include disordered eating behaviours outside of binge eating, purging, and fasting. These behaviours include, but not limited to, avoidance of specific foods, rigid food rules, and avoidance of eating in the presence of others. This lack of inclusion in ED studies may be due to the Diagnostic and Statistical Manual of Mental Disorders, 5th Edition (DSM-5) criteria not including less commonly studied behaviours. Previous research reported that quality of life in ED individuals remains poorer than healthy controls, implying that residual effects of EDs persist through recovery (De la Rie et al., 2005). Therefore, this suggests that studies which do not include less commonly studied eating-related behaviours define recovery through an incomplete lens.

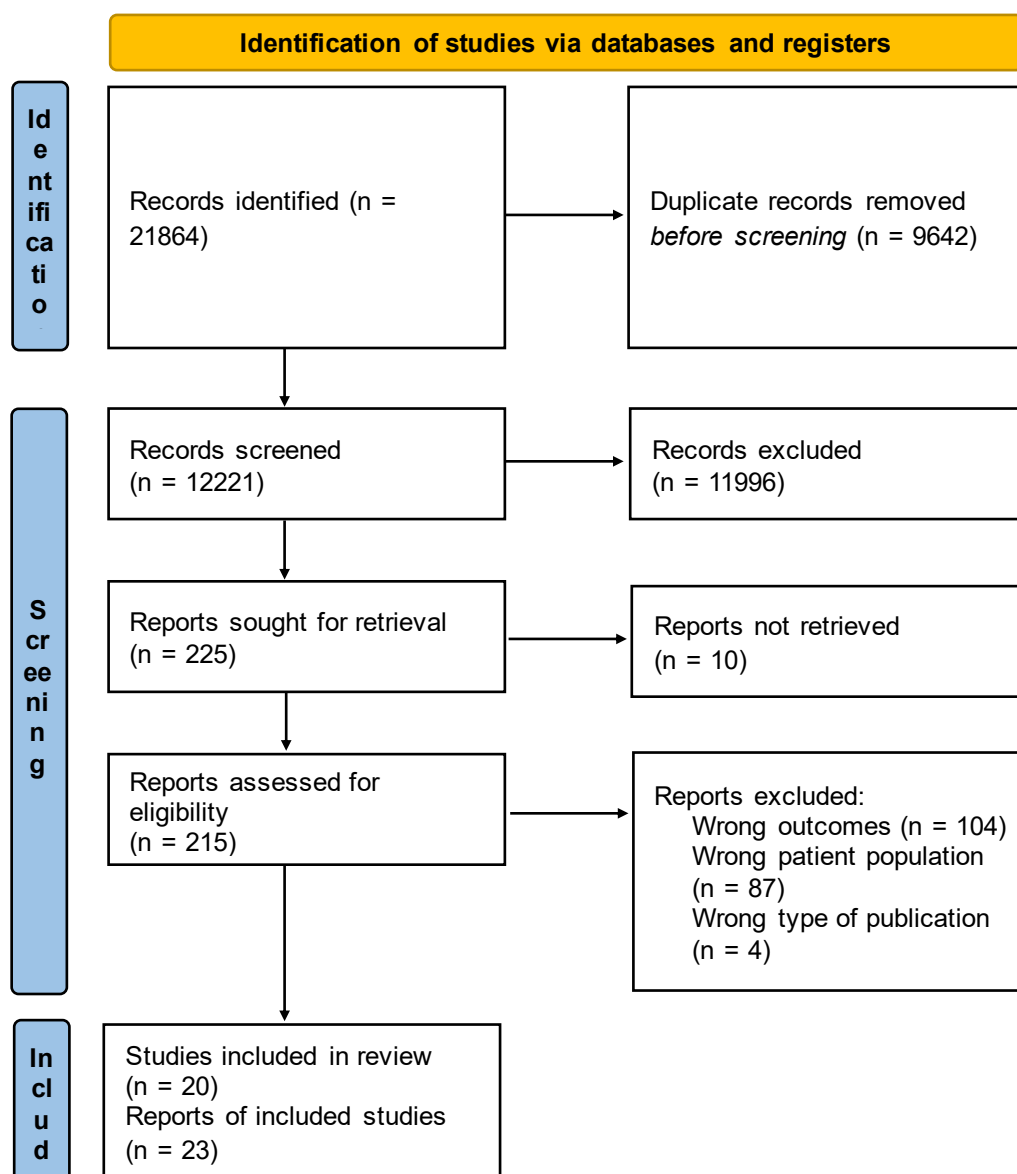
At the date of writing this, there are only a few studies reporting the dietary intake and eating behaviours of those recovered from EDs. In addition to this, there is currently no literature review synthesising the data on dietary intake and eating behaviours of those recovered from EDs. The aim of our literature review and narrative synthesis is to gather the findings on dietary intake and eating behaviour of those recovered from EDs. Through our review, we will depict a more complete description of what and how people recovered from EDs eat. Our findings can be used to help inform clinicians on interventions, nutrition education, and nutritional counselling used in the treatment of EDs.

### **3.3 Methodology**

#### **3.3.1 Protocol and Registration**

This systematic literature review was conducted and reported in accordance with the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) statement guidelines presented in Figure 1 (Page et al., 2021). Details of the protocol for this systematic review was

registered on PROSPERO (International Prospective Register for Systemic Reviews, Registration Number: CRD420250605506).



**Figure 1.** Flow diagram of study selection in a literature review on the dietary intake and eating behaviour in individuals recovered from eating disorders.

### 3.3.2 Search Strategy

A search of databases was completed using Pubmed, Scopus, Medline through OVID, Proquest Dissertations and Theses, and PsycInfo in May 2025. The search strategy was developed with the guidance of a specialist librarian and adapted to each database using key words such as “eating disorder\*” OR “anorexia nervosa” OR anorexi\* OR “bulimia nervosa” OR bulimi\* OR “binge eating disorder\*” OR “binge eating” OR binge\* OR binging OR “feeding disorder\*” AND recover\* OR remission OR rehabilitat\* OR restore\* OR restorat\* AND food\* OR diet\* OR nutrition\* OR

micronutrient\* OR macronutrient\* OR nutrient\* OR behaviour OR behavior OR eat\* OR “food group”. The full search strategy is provided in Appendix B. No study design, date, or language limits were applied to the search.

### 3.3.3 Study Selection

The study inclusion criteria were in accordance with the Patient population, Intervention, Comparative controls, Outcome, Statistical analysis (PICOS) framework (Saaqi & Ashraf, 2017). Patient population included individuals who have recovered from EDs subjectively or according to the criteria defined within each individual study. Studies that mention other EDs but have findings on AN, BN, BED, and OSFED was included in the literature review. Studies either had interventions or no interventions and had controls or no controls. Primary outcomes were macronutrient intake, micronutrient intake, intake of foods, meal frequency, food avoidance/restriction, and social eating. EDE-Q restraint score was also included because it illustrates food limiting and food avoiding behaviours.

Studies on EDs that do not include AN, BN, BED, and OSFED within their population were excluded. Data from participants who were not fully recovered from any of the selected EDs were not included in analysis. No study design was excluded. Non-English studies were translated through Google Translate. Covidence software was used during title and abstract screening and full-text review to facilitate screening against the inclusion and exclusion criteria (Babineau, 2014). Each retrieved study was title/abstract screened by researcher HK then re-screened (i.e. double screened) by a second researcher (GS or RL). HK completed full-text screening, while GS re-screened half of the selected studies and RL completed screening for the other half. Any disagreements were resolved through discussion to reach consensus.

### 3.3.4 Data Extraction and Synthesis

GS and RL extracted 10% of the selected studies (3 studies) and compared results with HK before HK continued data extraction for the rest of the studies. HK compiled findings from screened studies into a data table with Microsoft Excel (Version 2510). The following information was extracted: author and year; eating disorder; population; country; study design; sample size; definition of recovery; and outcome results that includes energy intake, carbohydrate intake, protein intake, fat intake, fibre intake, micronutrient intake, meal frequency, food avoidance/restriction, and EDE-Q restraint score. Extracted data was verified with one other author. Characteristics and results of included studies was grouped by outcome data. Results were described through narrative synthesis due to the high degree of heterogeneity between studies. Conceptually similar outcome measures were combined and grouped into the following five

categories: Nutrient, Food intake, Meal frequency, Food avoidance/restriction, Eating in a social setting, and EDE-Q restraint score.

The selected study's respective country of origin was used for comparing dietary intake data and dietary guideline recommendations between recovered ED individuals and the general population. As shown in table 1, three of the four studies reporting nutrient intake had a population mean age fitting the age range of 20 to 29 years, and all four studies had a female population. Thus, dietary intake data from the selected studies was compared to the dietary intake data of the females aged 20 to 29. Due to substantial under-reporting in the UK's National Diet and Nutrition Survey 2019 to 2023 (Swan, 2025), dietary intake data from the selected studies was compared to the dietary intake data of the females aged 20 to 29 living in the US (U.S. Department of Agriculture & Agricultural Research Service, 2024). The percentage comparison between recovered ED patients and females aged 20 to 29 living in the US was calculated by dividing mean intake consumed by study participants by mean intake consumed by the general population. The percentage comparison between recovered ED patients and dietary guideline recommendations was calculated by dividing mean intake consumed by study participants by recommended intake reported by the respective national guidelines (Department of Health, 1991; U.S. Department of Agriculture & U.S. Department of Health and Human Services, 2020).

### 3.3.5 Quality Assessment

All studies were appraised for reporting quality using the Mixed Methods Appraisal Tool (MMAT) version 2018 (Hong et al., 2018). The tool consists of two screening questions for all study types followed by five questions to assess quality indicators specific to each type of study. The five study types are qualitative, quantitative randomized controlled trials, quantitative non-randomized, quantitative descriptive, and mixed-methods studies. Studies are not excluded based on quality, but studies that satisfy more quality criteria are considered higher quality. HK completed all quality assessment independently. RL assessed two studies and GS assessed one study, adding up to a total of 10% of the selected studies.

## 3.4 Results

### 3.4.1 Study Selection

The literature search identified a total of 21,864 records. Of those, 9,642 duplicates were automatically removed. Title and abstract screening were completed for 12,221 records, which yielded 225 publications eligible for full-text screening. After double screening, a total of 20 studies were included in the narrative synthesis as shown in Figure 1.

### 3.4.2 Study Characteristics

Table 1-3 provide a summary of key characteristics and main findings of the included studies (N=20). All studies were reported in English. Two of the included studies reported on multiple cohorts, yielding in a total of 22 individual cohorts. Included studies were published between 1991 and 2025. Twenty percent (N=4) of the included studies were published within the previous 5 years (since 2021). Half of the included study designs were non-randomized quantitative studies (N = 10), slightly less than half were qualitative studies (N = 9; 45%), and the remaining study was a mixed method study (N=1, 5%). Of the quantitative studies, there were six analytical cross-sectional studies, two cohort studies, one non-randomized crossover study, and one non-randomized trial. Of the qualitative studies, there were four phenomenology studies, two grounded theory studies, one narrative research study, one multiple case study, and one thematic analysis. Seventeen studies used a mental health lens, while the remaining three studies used a nutrition lens. All studies were authored by a psychiatry or psychology researcher, while only two of the included studies were authored by a nutrition researcher.

Forty-five percent (n=9) of included studies reported no sponsorship, 30% (n=6) did not report on sponsorship, and 25% (n=5) reported sponsorship. Of the sponsored studies, two received funding from the National Institute of Mental Health, a government organization, one from a university, one study received funding from educational organization, and one from a charitable foundation. While the remaining study received funding from both a government and educational organization.

**Table 1:** Study characteristics and main findings of studies reporting nutrient intake and comparisons to general population intake and dietary guideline recommendations.

| Author, Year                      | ED | Definition of Recovery | Target Population; Country                    | Study design                     | Participant age; sex; ethnicity; sample size | Main Findings              |                        |                                                          |                                             |
|-----------------------------------|----|------------------------|-----------------------------------------------|----------------------------------|----------------------------------------------|----------------------------|------------------------|----------------------------------------------------------|---------------------------------------------|
|                                   |    |                        |                                               |                                  |                                              | Nutrient                   | Study mean intake (SE) | US female 20-29: mean intake (% difference) <sup>a</sup> | Recommendations (% difference) <sup>a</sup> |
| Patsalos et al 2021 <sup>bc</sup> | AN | DSM-IV <sup>e</sup>    | F from specialist ED services; United Kingdom | Analytical cross-sectional study | median = 24; 100% F; 96% C; N=23             | Energy (kcal) <sup>g</sup> | 1928.31 (875.55)       | -1                                                       | -1 <sup>g</sup>                             |
|                                   |    |                        |                                               |                                  |                                              | Carbohydrates (g)          | 232.42 (99.08)         | 4                                                        | NR <sup>h</sup>                             |
|                                   |    |                        |                                               |                                  |                                              | Protein (g)                | 73.61 (34.67)          | 1                                                        | 60                                          |
|                                   |    |                        |                                               |                                  |                                              | Fat (g)                    | 57.43 (35.27)          | -30                                                      | NR <sup>h</sup>                             |
|                                   |    |                        |                                               |                                  |                                              | Saturated fatty acids (g)  | 19.54 (14.91)          | -24                                                      | NR <sup>h</sup>                             |
|                                   |    |                        |                                               |                                  |                                              | Monounsaturated fat (g)    | 21.03 (12.46)          | -24                                                      | NR <sup>h</sup>                             |
|                                   |    |                        |                                               |                                  |                                              | Polyunsaturated fat (g)    | 11.91 (7.34)           | -41                                                      | NR <sup>h</sup>                             |
|                                   |    |                        |                                               |                                  |                                              | Dietary Cholesterol (mg)   | 168.56 (132.23)        | -38                                                      | NR <sup>h</sup>                             |
|                                   |    |                        |                                               |                                  |                                              | Fibre (g)                  | 23.28 (13.94)          | 43                                                       | -22                                         |
|                                   |    |                        |                                               |                                  |                                              | Retinol/Vitamin A (µg)     | 313.50 (358.19)        | -1                                                       | -22                                         |
|                                   |    |                        |                                               |                                  |                                              | β-carotene (µg)            | 5701.02 (4846.22)      | 176                                                      | NR                                          |
|                                   |    |                        |                                               |                                  |                                              | Thiamine/Vitamin B1 (mg)   | 1.94 (1.11)            | 29                                                       | 223                                         |
|                                   |    |                        |                                               |                                  |                                              | Riboflavin/Vitamin B2 (mg) | 1.97 (1.06)            | 18                                                       | 119                                         |
|                                   |    |                        |                                               |                                  |                                              | Niacin/Vitamin B3 (mg)     | 22.32 (11.79)          | -5                                                       | 306                                         |

|                                  |    |                                      |                  |                                  |                                      |                            |                 |     |                  |
|----------------------------------|----|--------------------------------------|------------------|----------------------------------|--------------------------------------|----------------------------|-----------------|-----|------------------|
|                                  |    |                                      |                  |                                  |                                      | Vitamin B6 (mg)            | 2.12 (1.01)     | 13  | 136              |
|                                  |    |                                      |                  |                                  |                                      | Vitamin B12 (µg)           | 3.51 (2.87)     | -9  | 181              |
|                                  |    |                                      |                  |                                  |                                      | Vitamin C (mg)             | 142.01 (91.63)  | 69  | 468              |
|                                  |    |                                      |                  |                                  |                                      | Vitamin D (µg)             | 2.11 (1.82)     | -44 | -79 <sup>i</sup> |
|                                  |    |                                      |                  |                                  |                                      | Vitamin E (mg)             | 15.44 (7.89)    | 56  | 209              |
|                                  |    |                                      |                  |                                  |                                      | Folate (µg)                | 375.31 (209.03) | -14 | 150              |
|                                  |    |                                      |                  |                                  |                                      | Iron (mg)                  | 13.22 (6.54)    | 15  | 97               |
|                                  |    |                                      |                  |                                  |                                      | Magnesium (mg)             | 388.72 (202.81) | 39  | 94               |
|                                  |    |                                      |                  |                                  |                                      | Selenium (µg)              | 54.35 (27.31)   | -49 | -9               |
|                                  |    |                                      |                  |                                  |                                      | Zinc (mg)                  | 8.67 (4.35)     | -5  | 58               |
| Casper et al 1998 <sup>bd</sup>  | AN | Morgan-Russell criteria <sup>f</sup> | F; United States | Non-randomized trial             | median =24.3; 100% F; NR; N=19       | Energy (kcal) <sup>g</sup> | 1290            | -33 | -35              |
|                                  |    |                                      |                  |                                  |                                      | Carbohydrates (g)          | 159.1           | 30  | 246              |
| Dellava et al 2011 <sup>bd</sup> | AN | DSM-IV ≥ 3 yrs                       | F; United States | Analytical cross-sectional study | mean = 32.5; 100% F; Largely C; N=15 | Energy (kcal) <sup>g</sup> | 1942 (543)      | 0   | -3               |
| Elmore et al 1991 <sup>bd</sup>  | BN | DSM IIIr                             | F; United States | Analytical cross-sectional study | mean = 22; 100% F; NR; N=12          | Energy (kcal)              | 1734            | -11 | -13              |

Note: ED = eating disorder; SE = standard error; AN = Anorexia Nervosa; DSM-IV = Diagnostic and Statistical Manual of Mental Disorders, Fourth Edition; F = females, C = Caucasian, yr = years; N = number of study participants; NR = not reported; DSM IIIr = Diagnostic and Statistical Manual of Mental Disorders, Third Edition, Revised; BN = Bulimia Nervosa.

<sup>a</sup>Red <80% of recommendations, Green = 80 to 120% of recommendations, Blue >120% of recommendations.

<sup>b</sup>Figures for mean intake consumed by females aged 20 to 29 years were obtained from U.S. Department of Agriculture and Agricultural Research Service (2024). Nutrient Intakes from Food and Beverages: Mean Amounts Consumed per Individual, by Male/Female and Age, *What We Eat in America*, NHANES August 2021-August 2023.

<sup>c</sup>Figures for RDI were obtained from Department of Health (1991). Dietary Reference Values A Guide, HMSO, 1991. These recommendations were intended for females aged 19 to 49 years.

<sup>d</sup>Figures for RDI were obtained from U.S. Department of Agriculture and U.S. Department of Health and Human Services (2020). Dietary Guidelines for Americans, 2020-2025. 9th Edition. December 2020. These recommendations were intended for females aged 19 to 30 years with a reference height of 5 foot and 4 inches (162.56 cm) and reference weight of 126 pounds (57.15 kg).

<sup>e</sup>DSM-IV = Diagnostic and Statistical Manual of Mental Disorders, 4<sup>th</sup> Edition; participants in this category no longer meet the criteria for their respective ED.

<sup>f</sup>Participants who met good outcome criteria according to Morgan and Russell (1975). Good — average weight for height, sex, and age (100±15% average body weight), and regular cyclical menstruation; Intermediate — average or near average weight for height, sex, and age (85-100% average body weight), and/or continued menstrual disturbances; Poor — constantly low body weight (<85% average body weight), and menstrual abnormalities.

<sup>g</sup>Energy figures assume a Physical Activity Level of 1.4 which is applicable to most people and represents low levels of physical activity at work and leisure.

<sup>h</sup>RDI for carbohydrates and fat were not reported by the Department of Health (1991). Dietary Reference Values A Guide, HMSO, 1991. These recommendations were intended for females aged 19 to 49 years.

<sup>i</sup>Due to lack of RDIs reported by Department of Health (1991), these figures were obtained from Public Health England (2016). Government recommendations for energy and nutrients for males and females aged 1–18 years and 19+ years. These recommendations were intended for females aged 19 to 64 years.

**Table 2:** Study characteristics and main findings of studies reporting eating behaviour.

| Author,<br>Year | ED | Definition<br>of<br>Recovery | Target<br>population;<br>Country | Study<br>design | Participant age;<br>sex; ethnicity;<br>sample size | Main findings |                |                                     |
|-----------------|----|------------------------------|----------------------------------|-----------------|----------------------------------------------------|---------------|----------------|-------------------------------------|
|                 |    |                              |                                  |                 |                                                    | Food intake   | Meal Frequency | Eating in the presence<br>of others |

|                           |                                                                         |                    |                                                                            |                                  |                                |                                                                                                                                                                       |                                                                        |                                                                                                    |
|---------------------------|-------------------------------------------------------------------------|--------------------|----------------------------------------------------------------------------|----------------------------------|--------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------|
| Björk et al 2008          | All EDs (4 AN, 4 BN, 6 EDNOS)                                           | Patient subjective | F patients from EDs unit at a university hospital; median age = 27; Sweden | Phenomenology                    | median = 27; 100% F; NR; N=14  | <p>↑ variety of food, including fruit/veg</p> <p>↑ intake of “unhealthy foods” eg. candy, cookies, and “rich desserts”</p> <p>↑ intake of “whatever one fancies”</p>  | 3 meals + snacks                                                       | Ate in the presence of others, even if they could not control what ingredients were in food        |
| Björk et al 2012          | All EDs (10 AN, 4 BN, 1 unspecified ED)                                 | Patient subjective | M from ED unit at university hospital; Norway and Sweden                   | Phenomenology                    | median = 23; 0% F; NR; N=15    | <p>↓ “excessive” alcohol</p> <p>Avoided buying “too much” food at grocery store</p>                                                                                   | 3 meals + snacks                                                       | Ate in social setting without feeling bad about or controlling portion size or type of food served |
| Gillespie & Robinson 2022 | All EDs (6 AN, 5 BN, 5 AN+BN, 2 other ED)                               | Patient subjective | Patients; United States                                                    | Convergent Design                | NR; N=18; NR; NR               |                                                                                                                                                                       | 3 meals + snacks or practiced intuitive eating, relying on hunger cues |                                                                                                    |
| Hansson et al 2011        | AN, BN, BED, and EDNOS (16 AN or EDNOS type 1/2, 18 BN or EDNOS type 3) | Patient subjective | Patients from a specialised ED unit; Sweden                                | Analytical cross-sectional study | median = 26.2; 97% F; NR; N=36 | <p>~33% ≥ 5 servings of fruit + veg/day</p> <p>73% avoided fatty foods, 43% avoided high sugar foods, 30% avoided fast foods, 25% avoided high carbohydrate foods</p> |                                                                        |                                                                                                    |

|                   |                                                   |                                    |                                                                                                        |                      |                                  |                                                                                                                                                                                                                                                                                                                                                                        |                  |                                                                                                                   |
|-------------------|---------------------------------------------------|------------------------------------|--------------------------------------------------------------------------------------------------------|----------------------|----------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------|-------------------------------------------------------------------------------------------------------------------|
| Tosi et al 2025   | All EDs (14 AN, 3 BN, 5 BED, 2 ARFID and 2 EDNOS) | Patient subjective                 | Lifetime ED recovered adults; No country specified as participants were recruited through social media | Thematic analysis    | NR; 95% F; NR; N=19              | <p>↑ “flexibility” + “spontaneity” with food</p> <p>↓ “rigid rules” or “prohibitions” e.g. fixation on portion size or type of food</p> <p>Ate for “pleasure” and enjoyment</p>                                                                                                                                                                                        |                  |                                                                                                                   |
| Butcher 2019      | AN                                                | Patient subjective                 | Pregnant F; United States                                                                              | Phenomenology        | mean = 32.3; 100% F; 100% C; N=3 | <p>No restriction of quantity or food variety.</p> <p>↑ intake of “whatever one desired”</p> <p>One vegetarian wanted to eat meat, and “higher fat higher protein” foods</p> <p>↑ intake of “high-calorie” foods and foods “once off limits” eg cream cheese, bagels, french fries</p>                                                                                 |                  |                                                                                                                   |
| Casper et al 1998 | AN                                                | Morgan and Russell (1975) criteria | F; United States                                                                                       | Non-randomized trial | mean = 24.3; 100% F; N=19        | 21% avoided sweets                                                                                                                                                                                                                                                                                                                                                     |                  |                                                                                                                   |
| Ulian et al 2013  | AN                                                | Morgan and Russell (1975) criteria | F; Argentina                                                                                           | Phenomenology        | mean = 26.28; 100% F; NR; N=7    | <p>Some avoided salt, fried foods, fats. Only ate meat if it did not have much fat</p> <p>↑ intake of desired foods eg bread, chocolate, cake, candy, fried food, fried pie, french fries, butter, sweets</p> <p>One only ate meals with various food groups including carbohydrates, protein, and veg. Avoided “empty calories” eg fast foods, burgers, and pizza</p> | 3 meals + snacks | One avoided eating around other people. Did not want others to see them eating. Did not like seeing others eating |

|              |     |                                        |                                                                                                  |                     |                                  |                                                                                                                                                                                                                                                                                                                                                  |                                                |  |
|--------------|-----|----------------------------------------|--------------------------------------------------------------------------------------------------|---------------------|----------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------|--|
|              |     |                                        |                                                                                                  |                     |                                  | <p>Some preferred “healthier alternatives” eg light version of foods, or olive oil instead of veg oil. Some avoided diet or light foods. One’s choice depended on calories, sugar content, and price</p> <p>One only ate food they consider “healthy” e.g. legumes, veg, fruit, etc</p> <p>One preferred to eat what they prepare themselves</p> |                                                |  |
| Krentz 2001  | BED | DSM-IV ≥ 6 months                      | F; Canada                                                                                        | Grounded theory     | mean = 33; 100% F; NR; N=6       | <p>↑ intake of desired foods</p> <p>No cutting foods out because it would make individuals obsess about it</p> <p>Most started off by abstaining from “binge foods” to recover, but later switched to incorporating these “forbidden foods”</p> <p>One avoided “binge foods” and all “sugars”. Likens binge eating to addiction</p>              | 3 meals without snacks                         |  |
| O'Byrne 1993 | BN  | DSM-IIIr criteria + patient subjective | F recovered from BN for ≥ 1 yr and have never been anorexic, alcoholic, or drug addicted; Canada | Grounded theory     | mean = 30; 100% F; 100% C; N=7   | <p>No restriction of quantity or food variety</p> <p>↑ intake of “high calorie” foods eg whipping cream</p> <p>One ate whatever they desired until satisfied but not continue she was full.</p> <p>One avoided sweets except licorice and cookies if she doesn’t eat the whole bag</p>                                                           | 3 meals without snacks                         |  |
| Platt 1992   | BN  | Patient subjective                     | F recovered from BN for ≥ 5 yrs and                                                              | Multiple case study | mean = 32.6; 100% F; 90% C; N=10 |                                                                                                                                                                                                                                                                                                                                                  | 3 meals without snacks, or 6 small meals a day |  |

|  |  |                                               |  |  |  |  |  |
|--|--|-----------------------------------------------|--|--|--|--|--|
|  |  | have been recovered for ≥ 1 yr; United States |  |  |  |  |  |
|--|--|-----------------------------------------------|--|--|--|--|--|

Note: ED = eating disorder; SE = standard error; AN = Anorexia Nervosa; DSM-IV = Diagnostic and Statistical Manual of Mental Disorders, Fourth Edition; F = females, C = Caucasian, yr = years; N = number of study participants; NR = not reported; DSM IIIr = Diagnostic and Statistical Manual of Mental Disorders, Third Edition, Revised; BN = Bulimia Nervosa; EDNOS = Eating Disorders Not Otherwise Specified; veg = vegetables; M = males; ARFID = Avoidant/Restrictive Food Intake Disorder; BED = Binge Eating Disorder.

**Table 3:** Study characteristics and main findings of studies reporting EDE-Q restraint scores of ED-recovered individuals

| Author, Year      | ED                         | Definition of Recovery              | Target Population; Country                                        | Study design                     | Participant age; sex; ethnicity; sample size | Main Findings                         |                                                                            |
|-------------------|----------------------------|-------------------------------------|-------------------------------------------------------------------|----------------------------------|----------------------------------------------|---------------------------------------|----------------------------------------------------------------------------|
|                   |                            |                                     |                                                                   |                                  |                                              | Study mean EDE-Q restraint score (SE) | Female 18-42: Mean EDE-Q restraint score (difference in mean) <sup>a</sup> |
| Romano et al 2019 | AN, BN, BED, and Other EDs | Bardone-Cone et al. (2010) criteria | Lifetime ED recovered adults; United States                       | Analytical cross-sectional study | mean = 30.1; 93.2% F; 92% C; N=16            | 0.5                                   | -0.8                                                                       |
|                   |                            | Patient subjective                  |                                                                   |                                  | mean = 30.1; 93.2% F; 92% C; N=38            | 1.2                                   | -0.1                                                                       |
| Dawson et al 2014 | AN                         | Bardone-Cone et al. (2010) criteria | F recovered from AN for ≥ 5 yrs and had AN for > 7 yrs; Australia | Narrative research               | NR; 100% F; NR; N=8                          | 0.075                                 | -1.225                                                                     |
| Eddy et al 2017   | AN                         | PSR score of ≤ 2 for 1 yr           | F from outpatient ED services; United States                      | Cohort study                     | mean = 45; 100% F; 95% C; N=76               | 0.8                                   | -0.5                                                                       |

|                         |    |                           |                                                                       |                                  |                                |      |       |
|-------------------------|----|---------------------------|-----------------------------------------------------------------------|----------------------------------|--------------------------------|------|-------|
|                         | BN |                           | F from outpatient ED services; United States                          |                                  | mean = 49; 100% F; 95% C; N=73 | 1.3  | 0     |
| Gura-Solomon et al 2024 | AN | PSR score of ≤ 2 for 1 yr | F recovered from AN for ≥ 2 yrs, have ≥ 12 years of education; Israel | Analytical cross-sectional study | mean = 25.1; 100% F; NR; N=43  | 2.17 | 0.87  |
| Lo Sauro et al 2013     | AN | DSM-IV                    | Adults from outpatient ED services; Italy                             | Cohort study                     | mean = 26.29; 93% F; NR; N=73  | 1.37 | 0.07  |
| Ward et al 1998         | AN | DSM-IV                    | F; United Kingdom                                                     | Non-randomized cross-over design | mean = 30.6; 100% F; NR; N=18  | 1.21 | -0.09 |

Note: ED = eating disorder; SE = standard error; AN = Anorexia Nervosa; DSM-IV = Diagnostic and Statistical Manual of Mental Disorders, Fourth Edition; F = females, C = Caucasian, yr = years; N = number of study participants; NR = not reported; DSM IIIr = Diagnostic and Statistical Manual of Mental Disorders, Third Edition, Revised; BN = Bulimia Nervosa; EDNOS = Eating Disorders Not Otherwise Specified; BED = Binge Eating Disorder; PSR score = Psychiatric Status Rating score.

<sup>a</sup>Mean EDE-Q dietary restraint sub score for females aged 18 to 42 years according to Fairburn et al. (1993). The eating disorder examination. International Journal of Eating Disorders, 6(1), 1-8.

### 3.4.3 Population Characteristics

There was a total of 549 participants recovered from EDs. Fourteen studies consisted of females only, one study consisted of males only, and the remaining five studies included both male and female participants. The studies that included both males and females had a 93% to 97% female cohort. One study's participants were females recovered from AN while being pregnant (Butcher, 2019).

Nine studies (45%) took place in the United States, two studies (10%) in the United Kingdom, and two studies (10%) in Sweden. One study did not have a specified country and was conducted online through social media. While the remaining six studies each took place in Canada, Australia, Italy, Israel, Argentina, and a combination of Norway and Sweden. Seventeen (85%), arguably 18 including the study that recruited participants from social media, of the 20 studies were from an English-speaking country.

The most common criteria for the definition of recovery included patient subjective (n=8), followed by DSM-IV (n=5) and PSR score (n=3). The remaining studies had criteria of Morgan Russel (n=2), Bardone-Cone (n=2), DSM-IIIr (n=1), and a combination of DSM-IIIr and Patient subjective (n=1).

Out of the 20 included studies, 14 studies included participants at least 18 years of age, five studies did not have an inclusion criterion regarding age, while the remaining one study included participants at least 12 years of age.

### 3.4.4 Study Quality

The quality assessment is provided in table 4. Twelve of 20 studies (60%) satisfied all applicable MMAT quality criteria indicating strong quality. The remaining eight of the included studies (40%) had one or more "no" or "not reported" responses indicating poor quality. This was due to inadequate detail regarding methods, incomplete outcome data, confounders not being accounted for, the intervention not being administered as intended, and/or poor quality in the qualitative and/or quantitative part of the study. Out of the eight quantitative non-randomised studies, only one study (5%) fulfilled all applicable quality criteria.

**Table 4:** Quality assessment of studies included in a systematic literature review on what and how people recovered from eating disorders eat using the Mixed Methods Appraisal Tool

| Author, Year              | S1 <sup>a</sup> | S2 <sup>b</sup> | Study Design <sup>c</sup> | Q1              | Q2             | Q3 | Q4 | Q5 | Comments (related to not meeting criteria)                                                                      |
|---------------------------|-----------------|-----------------|---------------------------|-----------------|----------------|----|----|----|-----------------------------------------------------------------------------------------------------------------|
| Patsalos et al 2021       | Y <sup>d</sup>  | Y               | 3                         | Y               | N <sup>e</sup> | Y  | N  | Y  | Use of food frequency questionnaire an outdated and inaccurate method of data collection on nutritional intake. |
| Casper et al 1998         | Y               | Y               | 3                         | NR <sup>f</sup> | Y              | Y  | Y  | Y  | Clear description of inclusion and exclusion criteria not reported.                                             |
| Dellava et al 2011        | Y               | Y               | 3                         | Y               | Y              | Y  | Y  | Y  | NA <sup>g</sup>                                                                                                 |
| Elmore et al 1991         | Y               | Y               | 3                         | NR              | Y              | Y  | Y  | Y  | Clear description of inclusion and exclusion criteria not reported.                                             |
| Björk et al 2008          | Y               | Y               | 1                         | Y               | Y              | Y  | Y  | Y  | NA                                                                                                              |
| Björk et al 2012          | Y               | Y               | 1                         | Y               | Y              | Y  | Y  | Y  | NA                                                                                                              |
| Gillespie & Robinson 2022 | Y               | Y               | 5                         | N               | Y              | Y  | Y  | N  | Rationale not given for mixed methods approach<br>Strong quality qualitative<br>Poor quality quantitative       |
| Hansson et al 2011        | Y               | Y               | 3                         | Y               | Y              | Y  | Y  | Y  | NA                                                                                                              |
| Tosi et al 2025           | Y               | Y               | 1                         | Y               | Y              | Y  | Y  | Y  | NA                                                                                                              |
| Butcher 2019              | Y               | Y               | 1                         | Y               | Y              | Y  | Y  | Y  | NA                                                                                                              |
| Ulian et al 2013          | Y               | Y               | 1                         | Y               | Y              | Y  | Y  | Y  | NA                                                                                                              |
| Krentz 2001               | Y               | Y               | 1                         | Y               | Y              | Y  | Y  | Y  | NA                                                                                                              |
| O'Byrne 1993              | Y               | Y               | 1                         | Y               | Y              | Y  | Y  | Y  | NA                                                                                                              |
| Platt 1992                | Y               | Y               | 1                         | Y               | Y              | Y  | Y  | Y  | NA                                                                                                              |
| Romano et al 2019         | Y               | Y               | 3                         | Y               | Y              | N  | Y  | Y  | Only 70% of participants submitted complete data for survey.                                                    |
| Dawson et al 2014         | Y               | Y               | 1                         | Y               | Y              | Y  | Y  | Y  | NA                                                                                                              |
| Eddy et al 2017           | Y               | Y               | 3                         | Y               | Y              | N  | Y  | Y  | Only 77% of initial sample participated in the follow-up study. Up to 43% of the data sets had missing data.    |

|                         |   |   |   |   |   |    |   |   |                                      |
|-------------------------|---|---|---|---|---|----|---|---|--------------------------------------|
| Gura-Solomon et al 2024 | Y | Y | 3 | Y | Y | NR | Y | Y | Questionnaire response rate missing. |
| Lo Sauro et al 2013     | Y | Y | 3 | Y | Y | Y  | Y | Y | NA                                   |
| Ward et al 1998         | Y | Y | 3 | Y | Y | Y  | Y | Y | NA                                   |

<sup>a</sup>S1 = clear research question.

<sup>b</sup>S2 = data collected to address research question.

<sup>c</sup>Study design 1 (qualitative) = Q1: approach appropriate for research question; Q2: data collection methods answer research question; Q3: findings adequately derived from data; Q4: interpretation of results supported by data; and Q5: coherence between data source, collection, analysis and interpretation. 3 (quantitative non-randomized) = Q1: participants representative of target population; Q2: measurements appropriate regarding outcome and intervention; Q3: complete outcome data; Q4: confounders accounted for in design and analysis; and Q5: intervention administered as intended. Study design 5 (mixed methods) = Q1: adequate rationale for mixed methods design; Q2: components of study integrated effectively to answer research question; Q3: outputs of integration adequately interpreted; Q4: divergences and inconsistencies adequately addressed; and Q5: components adhere to the quality criteria of each method.

<sup>d</sup>Y = yes.

<sup>e</sup>N = no.

<sup>f</sup>NR = not reported.

<sup>g</sup>NA = not applicable.

### 3.4.5 Data synthesis by outcome

#### Nutrient Intake

Daily nutrient intakes of individuals recovered from EDs are reported in table 1. Four studies reported on energy intake of individuals recovered from EDs (Casper et al., 1988; Dellava et al., 2011; Elmore & de Castro, 1991; Patsalos et al., 2021). Three of these studies were on AN recovered females (Casper et al., 1988; Dellava et al., 2011; Patsalos et al., 2021), while the remaining study was on BN recovered females (Elmore & de Castro, 1991). These studies showed that people had recovered from ED ate the same or less than the general population. The energy intake of these recovered individuals vary from 1290 to 1942 kcal, and the mean energy intake across these studies is 1727 kcal (Casper et al., 1988; Dellava et al., 2011; Elmore & de Castro, 1991; Patsalos et al., 2021). Three of the four studies showed that ED recovered female patients consumed 89-100% of energy intake of females aged 20 to 29 living in the US (Casper et al., 1988; Elmore & de Castro, 1991; Patsalos et al., 2021), while the remaining study showed ED recovered female patients only consumed 67% (Dellava et al., 2011).

The one study that reported daily protein intake was an analytical cross-sectional study of females recovered from AN (Patsalos et al., 2021). In both studies, females recovered from AN ate adequate amounts of protein when compared with the general population and dietary recommendations.

However, one study showed AN recovered participants to consume more than double the general population and more than triple the EAR (Casper et al., 1988).

One study reported fat intake of females recovered from AN and found that these individuals consume 70% of total fat intake of females aged 20 to 29 living in the US (Patsalos et al., 2021). Similarly, decreased intake compared to the general population was reported for saturated fatty acids, monosaturated fat, polyunsaturated fat, and dietary cholesterol as presented in Table 1. The same study found that females recovered from AN ate adequate amounts of carbohydrates when compared with the general population and dietary recommendations. Regarding micronutrient intake, females recovered from AN consumed 176% more for  $\beta$ -carotene and 69% more for vitamin C than the general population. On the other hand, these individuals consumed 49% less than the daily intake for selenium than the females aged 20 to 29 in the US.

### Eating behaviour

Of the ten studies that reported eating behaviour, eight studies reported the increase or decrease in the intakes of specific foods (Björk & Ahlström, 2008; Björk et al., 2012; Butcher, 2019; Hansson et al., 2011; Krentz, 2001; O'Byrne, 1993; Tosi et al., 2025; Ulian et al., 2013), seven studies mentioned meal frequency (Björk & Ahlström, 2008; Björk et al., 2012; Gillespie & Robinson, 2022; Krentz, 2001; O'Byrne, 1993; Platt, 1992; Ulian et al., 2013), and five studies mentioned eating in a social setting (Björk & Ahlström, 2008; Björk et al., 2012; O'Byrne, 1993; Platt, 1992; Ulian et al., 2013).

Out of the ten studies, seven studies reported that individuals recovered from EDs follow a regular eating pattern (Björk & Ahlström, 2008; Björk et al., 2012; Gillespie & Robinson, 2022; Krentz, 2001; O'Byrne, 1993; Platt, 1992; Ulian et al., 2013). Of the six studies, four reported ED recovered individuals to have a meal routine of three main meals with snacks in between (Björk & Ahlström, 2008; Björk et al., 2012; Platt, 1992; Ulian et al., 2013), while the remaining three reported a strict meal routine of only three main meals a day (Krentz, 2001; O'Byrne, 1993; Platt, 1992). Three out of the 10 included studies identified individuals recovered from EDs to have a flexible approach to eating. Of these three studies, two found individuals to have a regular meal pattern while adjusting portion size or skipping snacks depending on their satiety and hunger (i.e. intuitive eating) (Gillespie & Robinson, 2022; O'Byrne, 1993). The remaining study reports an individual to follow a meal routine that emphasises flexible meal times, focusing less on the exact time of meal consumption and more on the structure of regular meals throughout the day (Björk & Ahlström, 2008). Six studies reported individuals recovered from EDs ate whatever they desired (Björk & Ahlström, 2008; Butcher, 2019; Krentz, 2001; O'Byrne, 1993; Tosi et al., 2025; Ulian et al., 2013).

Four studies reported individuals recovered from EDs included the intake of foods with high calorie content in their diet (Björk & Ahlström, 2008; Björk et al., 2012; Butcher, 2019; O'Byrne, 1993). While, four other studies reported individuals recovered from EDs to exclude sweets, high calorie food, fatty food, salt, or other foods with connotations similar to “unhealthy” food (Casper et al., 1988; Hansson et al., 2011; Krentz, 2001; Ulian et al., 2013). Although one study reported individuals to initially abstain from binge foods, most individuals in this study later incorporated these binge foods into their diet (Krentz, 2001). Three studies reported individuals recovered from EDs ate without restricting quantity or type of food (Butcher, 2019; O'Byrne, 1993; Tosi et al., 2025). Two studies found recovered individuals to be comfortable with eating in social settings which was previously a difficult and often avoided situation (Björk & Ahlström, 2008; Björk et al., 2012). However, one study reported two AN recovered individuals to avoid eating out or around other people (Ulian et al., 2013).

### EDE-Q Restraint Score

Six studies including eight samples reported EDE-Q restraints scores of individuals recovered from EDs (Dawson et al., 2014; Eddy et al., 2017; Gura-Solomon et al., 2024; Lo Sauro et al., 2013; Romano & Ebener, 2019; Ward et al., 1998). Five of the studies focused on females recovered from AN (Dawson et al., 2014; Eddy et al., 2017; Gura-Solomon et al., 2024; Lo Sauro et al., 2013; Ward et al., 1998), while the remaining study looked at AN, BN, and other EDs (Romano & Ebener, 2019). Studies showed that people had recovered from ED had similar or lower scores than the general population. Only one of the studies showed that individuals recovered from EDs to score nearly one point higher than the general population, while the remaining five studies had nearly equal or a lower score than the general population. The mean EDE-Q restraint scores of those recovered from an ED ranged from 0.08 to 2.17. While the mean EDE-Q restraint scores across the eight samples was 1.08.

## 3.5 Discussion

### 3.5.1 Macronutrient intake

The aim of this review was to synthesise and report the dietary intakes and eating behaviour of individuals recovered from EDs. This was the first literature review investigating the nutrient intakes and eating behaviours of those recovered from EDs. When compared to the general population, individuals recovered from EDs in our review had considerably lower energy and fat intake. This dietary pattern of inadequate energy intake was also observed in previous research. Stiles (2014) found that individuals recovered from EDs perceived normal diets to have a median energy content of 1468 kcal. Previous research has identified undereating and restrictive eating behaviours as triggers for the onset of AN, BN, and binge eating (Burton & Abbott, 2017; Garner, 1993; Kirkley, 1986). Excessive undereating, or starvation, increases food preoccupations (Grave et al., 2011) and

augments the perception of fullness (Riedlinger et al., 2020). Even when weight loss does not occur, undereating may reinforce compensatory behaviours like fasting and purging. Individuals with BN or BED use compensatory behaviours as a leeway for binge eating, often leading to perpetual cycles of bingeing and compensation (Fairburn et al., 2003)

Individuals recovered from AN in our review had 30% less fat intake than the general population. This dietary pattern of low fat intake is commonly observed in previous studies measuring dietary intake in individuals with EDs (Jenkins et al., 2024). In particular, those with AN typically have low energy intakes and avoid energy-dense foods and fats (Jenkins et al., 2024; Schebendach et al., 2019). A qualitative study in our review reported that 73% individuals recovered from EDs avoided fatty foods while 30% avoided fast foods which also typically has high amounts of fat (Hansson et al., 2011). Low intake of energy and fat could indicate that recovered individuals are following healthy eating advice meant for the general population and continue to restrict the intake of high energy and high fat foods. While the REAL Food Guide recommends the consumption of nuts, oils, fats and incorporate “fun foods” into their daily diet. Despite the low intakes of energy and fat, individuals recovered from AN in our review had similar protein intakes compared to the general population.

### 3.5.2 Micronutrient intake

Except for retinol and vitamin D, individuals recovered from AN in our review exceeded most of the micronutrient RDIs by over 100%. This indicates recovered individuals eat adequate amounts from various food groups. With regards to inadequate micronutrient intake, recovered individuals consumed less vitamin D, selenium, and retinol than the general population and the RDI. Although previous research highlights the risk of iron deficiency in individuals with EDs (Setnick, 2010), recovered individuals in this review consumed substantially more iron than the general population and the RDI.

Fruits and vegetables are high in fibre,  $\beta$ -carotene, vitamin A, and vitamin E (Saura-Calixto et al., 2009). Individuals recovered from AN in our review consumed significantly more fibre, vitamin E, vitamin C, and  $\beta$ -carotene than the general population. Therefore, we can deduce that recovered individuals ate more fruits and vegetables compared to the general population. High intakes of fruits and vegetables was also observed in Hansson et al.'s (2011) study whereby approximately a third of individuals recovered from EDs consumed at least five servings of fruits or vegetables per day. While only 11% of the control group consumed at least five servings of fruit and vegetables per day. Previous research also found that individuals recovered from EDs perceived a normal diet to consist of at least 2 servings of fruit and 3 servings of vegetables a day (Stiles, 2014).

Dietary sources high in vitamin D include fatty fish, cod liver oil, milk and dairy products, and vitamin D fortified mushrooms (Benedik, 2021). Individuals recovered from AN in Patsalos et al.'s (2021) study had significantly low intake of vitamin D compared to the general population and the RDI, signifying low intakes of these foods rich in vitamin D. Low calcium intake is also associated with low dairy intake, however the claim of low dairy consumption in recovered individuals could not be backed in conjunction with low vitamin D intake because calcium intake was not reported in any of the studies in this review.

Retinol mainly comes from animal sources such as organ meats, seafood, dairy products, and eggs (Blaner, 2020). Selenium content in foods is largely dependent on selenium content in the soil (Navarro-Alarcon & Cabrera-Vique, 2008). Foods such as chicken, fish, eggs, dairy, and Brazil nuts are rich in selenium content (Chen et al., 2021), however the general population receives most of their dietary selenium from meats and bread (Lei et al., 2022). While sources high in iron include meat, seafood, cereals/grains, legumes, and dark green vegetables (Samaniego-Vaesken et al., 2017; U.S. Department of Agriculture & Agricultural Research Service, 2024; U.S. Department of Agriculture & U.S. Department of Health and Human Services, 2020). Despite low meat and dairy intake implied by the low selenium, retinol, and vitamin D intake, individuals recovered from AN had similar protein intakes compared to the general population. In addition to the findings of high iron intake and implied increased intake of fruits and vegetables in recovered individuals, these findings altogether suggest individuals recovered from AN consume more legumes compared to the general population.

### 3.5.3 Eating behaviour

Amongst the ten qualitative studies in our review, the most described eating behaviour was following a “regular” meal pattern whereby individuals recovered from EDs in these studies ate at least three meals per day. This meal pattern of consuming at least three meals per day is one of the central nutrition recommendations in the guidelines for FBT (Lock, 2011; Sterling et al., 2019) and CBT (Murphy et al., 2010). Both of these psychotherapies are first line treatments for EDs. Previous research reported that recovered individuals perceived a normal diet to consist of three main meals with two to three snacks in between (Stiles, 2014).

Another central nutrition recommendation in ED treatment guidelines, incorporating “desired foods” or previously avoided foods was the next most described eating behaviour amongst individuals recovered from EDs in our review. These foods include fatty foods, high sugar foods, fast foods, “unhealthy foods”, and “high calorie foods”. When comparing these terms to eating guidelines such as the REAL Food Guide, these foods fall under the category of “fun foods” and “treat foods”. Previous research shows that individuals recovered from EDs perceived a normal diet to include treat food and fats every day (Stiles, 2014). The mean EDE-Q restraint score of individuals

recovered from EDs in the included eight samples was 1.08, while the EDE-Q restraint score of females in the general population was 1.25 (Fairburn et al., 1993). Except for one sample that had a mean EDE-Q restraint score of 2.17, a score nearly one point higher than the general population, the remaining seven samples had approximately equal or lower scores than the general population. This suggests that these individuals recovered from EDs show restrictive eating behaviours less frequently than the general population. These behaviours include limiting food intake, avoiding eating for long periods, avoiding specific foods, and following dietary rules. Other studies in our review support the finding that recovered individuals show restrictive eating behaviours less frequently. With regards to avoiding eating for long periods of time, seven qualitative studies reported recovered individuals maintaining eating pattern of at least three meals a day. While with avoidance of specific foods and rigid dietary rules, seven studies reported individuals recovered from EDs had included the intake of “high calorie foods” or “desired foods” in their diet. Limiting food intake on the other hand, may be a disordered eating behaviour that persists through recovery. The four studies measuring energy intake in our review found that recovered individuals have considerably lower energy intake compared to the general population.

### **3.6 Conclusion**

To include a broader range of data on dietary intake and eating behaviours we employed a narrative synthesis, enabling the linking of studies with different methodologies (e.g. definition of recovery and study design). Due to the limited amount of data and high methodological variability, it was not suitable to conduct other types of synthesis such as a meta-analysis. While meta-analyses require studies with large samples, studies with small sample sizes delve deeper into specific or complex contexts typically lost in large datasets. A narrative synthesis allows the extraction of qualitative findings, whereby words and quotes are gathered to illustrate a series of connected events.

This review had several limitations, both in terms of the included studies and the review process. One of the most significant limitations was the lack of data. Although differences in dietary intake between individuals with active AN, BN, and BED have been highlighted in previous research (Jenkins et al., 2024), we could not draw conclusions on what micronutrients individuals recovered from BN and BED consume. This is because only one study in the review measured micronutrient intake, and the population sample only included individuals recovered from AN (Patsalos et al., 2021). Additionally, most of the studies in our review had a lack of participants who had recovered from BED. Most participants were individuals who had recovered from AN, BN, or their OSFED counterparts.

In addition to the lack of empirical data, the sample population of the studies in our review were predominantly female, over the age of 18 years, from English-speaking countries, and from high-

income countries. Overall, the conclusions we drew for EDs in general might not be specific or apply to individuals recovered from BED, from non-English speaking countries, from middle to low-income countries, under 18 years of age, or males. Previous research indicates there are phenomenological, comorbidity, and behavioural outcome differences between males and females (Capuano et al., 2025). Future research in this area will help to advance our understanding of the health inequities faced by these under researched groups of people.

Research investigating both nutrient intakes and serving intakes for each food group is needed. At the time of writing this thesis, a meta-analysis measuring the dietary intake of individuals recovered from EDs cannot be produced due to the lack of empirical data, thus calling the need for quantitative studies in this area. Additionally, measuring food group intake will enable direct comparison to eating guidelines specifically made for EDs such as the REAL Food Guide (Hart et al., 2018). Food group intake data will also inform the validity of the hypotheses of low dairy and meat consumption, as well as high fruit and vegetable consumption. Further research investigating dietary intake in individuals recovered from EDs would enable statistical correlations of dietary intake with recovery psychometrics, helping identify which specific dietary patterns and eating behaviours will be the most important to target in ED treatment. Particularly with nutrient intakes, we can establish recommended intakes for energy and macronutrients with aim of long-term recovery from EDs.

With regards to plant-based eating, findings from our review suggest that recovered individuals ate more legumes than the general population. Hunter et al. (2024) reported findings that plant-based eating contributed to reducing the urges to purge in those with EDs. However, the relationship between plant-based eating and long-term recovery is still largely under researched in the ED space. Thus, future research could investigate the intake of legumes in individuals recovered from EDs.

Although individuals recovered from EDs in our review had low energy, fat, dairy, and meat intake compared to the general population, they had high vegetable and fruit intake. In terms of eating behaviours, recovered individuals ate at least three meals per day and included the intake of previously avoided or restricted foods to their diet. Overall, the dietary patterns in individuals recovered from EDs look different compared to the general population and individuals with active EDs. There is a need for future research on the under-researched population of individuals recovered from EDs.

## Chapter 4: Discussion and Conclusion

### 4.1 Discussion

This systematic literature review included 20 studies investigating the nutrient intakes and eating behaviours of those recovered from eating disorders (EDs). The first aim of this review was to investigate the nutrient intakes of people who have recovered from EDs. The most concerning finding was inadequate energy intake in individuals recovered from EDs. Findings from four studies in this review show that individuals recovered from Anorexia Nervosa (AN) and Bulimia nervosa (BN) consume up to 33% less than the general population, and between 1% to 35% less energy than the Recommended Daily Intake (RDI) (Casper et al., 1988; Dellava et al., 2011; Elmore & de Castro, 1991; Patsalos et al., 2021). However, when considering recovery criteria, the three studies that defined recovery using the Diagnostic and Statistical Manual of Mental Disorders (DSM) criteria only have 1% to 13% less energy consumption than the RDI. While, in the remaining study which used the Morgan-Russell criteria, Casper et al. (1988) found recovered individuals to eat 35% less than the RDI (Morgan & Russell, 1975). This dietary pattern of inadequate energy intake is also observed in Stiles' (2014) thesis, where individuals recovered from EDs perceived normal diets to have a median energy content of 1468 kcal. This was 462 kcal (24.3%) below the United Kingdom (UK) recommendations of 1930 kcal (Public Health England, 2016), and was 256 kcal below the mean energy intake across the studies in our review.

Low energy intake compared to RDI is concerning for those with a history with any type of ED, as reduced dietary intake marks a trajectory towards weight loss and low body weight. Undereating and restrictive eating behaviours are known to be triggers for the onset of AN, BN, and binge eating (Burton & Abbott, 2017; Garner, 1993; Kirkley, 1986). In more severe cases of undereating, starvation is a perpetual driver for disordered eating behaviours. For example, starvation increases food preoccupations (Grave et al., 2011), and augments the perception of fullness (Riedlinger et al., 2020). Even when weight loss does not occur, undereating may reinforce compensatory behaviours like fasting and purging. In the case of those with BN, compensatory behaviours become a leeway for binge eating, often leading to perpetual cycles of bingeing and compensation (Fairburn et al., 2003).

While most of the recovered individuals in these studies consume close to the RDI, these RDIs for energy might not be suitable intake levels for people with a history of EDs. The UK and US dietary guidelines capped the recommended intake at 1940 kcal and 2000 kcal respectively with the intention of addressing of overweight and obesity in the general population (Public Health England, 2016; U.S. Department of Agriculture & U.S. Department of Health and Human Services, 2020). The UK recommendations of 1940 kcal is 213 kcal above the mean energy intake across the studies in our review, while the US recommendations of 2000 kcal is 273 kcal above our findings. Additionally, capping energy intake at substantially low levels is not practical for the average person. For

example, a 25-year-old female with a BMI of 22 kgm<sup>-2</sup> and has moderate physical activity requires a total of 2152 kcal a day. Even if an individual with an ED is overweight or obese, weight loss is not a primary treatment goal prioritised by ED treatment guidelines. In the REAL Food Guide, Hart et al. (2018) encourages recommendations that enable individuals with EDs to meet all nutritional requirements, especially energy requirements to ensure weight restoration or maintenance.

In the one study that reported fat intake, Patsalos et al. (2021) found individuals recovered from AN had 30% less fat intake than the general population. This finding of low-fat intake is supported by Hansson et al.'s (2011) cross-sectional study that investigated the eating behaviours in ED patients three years after starting treatment. Among those recovered from EDs, 73% avoided fatty foods and 30% avoided fast foods which are typically high in fat (Hansson et al., 2011). Previous research points out that individuals with AN commonly have low energy intake and typically avoid energy-dense foods and fats (Jenkins et al., 2024; Schebendach et al., 2019). The finding of low intake of energy and fat could indicate that recovered individuals are following healthy eating advice meant for the general population and continue to restrict the intake of high energy and high fat foods. This contrasts with the recommendations in the REAL Food Guide which advises individuals to consume fats every day and incorporate “fun foods” into their diet. This is supported by one of the studies in our review reporting that recovered individuals had difficulty in stopping the use of diet foods or light foods (Ulian et al., 2013).

Although examining micronutrient intake was one of our main objectives, this review only found one study investigating micronutrient intake in 23 individuals recovered from AN (Patsalos et al., 2021). Using the data available from this study, we found that individuals recovered from AN consumed 44% less vitamin D than the general population and 79% less vitamin D than the RDI (Patsalos et al., 2021). Individuals recovered from AN consumed 49% less selenium than the general population, however only consumed 9% less selenium than the RDI. Individuals recovered from AN consumed 22% less retinol than the RDI, but only 1% less than the general population. Although Setnick (2010) highlighted the risk of iron deficiency in individuals with EDs, individuals recovered from AN in Patsalos et al.'s (2021) study had adequate iron intake as they consumed 97% more iron than the RDI, and 15% more iron than the general population. Except for retinol and vitamin D intake which were substantially below the RDI, individuals recovered from AN in Patsalos et al.'s (2021) study exceeded most of the micronutrient RDIs by over 100%, indicating recovered individuals eat adequate amounts from various food groups.

Fibre intake of individuals recovered from AN in Patsalos et al.'s (2021) study was 23.28 g which is 6.72 g (22%) below the RDI of 30 g of fibre (Department of Health, 1991). Although, these individuals consumed 43% more fibre than the general population. Our study used the RDI for fibre in the UK guidelines and was notably higher than the RDI of fibre in other guidelines such as the

Nutrient Reference Values for Australia and New Zealand (National Health and Medical Research Council et al., 2006), and Dietary Reference Intakes (Government of Canada, 2010). These guidelines recommend 25 g of fibre a day, which is only 1.72 g above the intake of individuals recovered from AN in this review.

Fruits and vegetables are high in fibre,  $\beta$ -carotene, vitamin A, and vitamin E (Saura-Calixto et al., 2009). Patsalos et al.'s (2021) study showed individuals recovered from AN to consume significantly more fibre, vitamin E, vitamin C, and  $\beta$ -carotene than the general population. Therefore, we can deduce that recovered individuals ate more fruits and vegetables compared to the general population. This finding is supported by the qualitative finding from Hansson et al.'s (2011) study that reported about a third of individuals recovered from EDs consumed at least five servings of fruits or vegetables per day. While in contrast, only 11% of the age-matched female control group consumed at least five servings a day. Additionally, previous research found that recovered individuals perceived a normal diet to consist of at least 2 servings of fruit and 3 servings of vegetables a day (Stiles, 2014).

Dietary sources high in vitamin D include fatty fish, cod liver oil, milk and dairy products, and vitamin D fortified mushrooms (Benedik, 2021). Individuals recovered from AN in Patsalos et al.'s (2021) study had significantly low intake of vitamin D compared to the general population and the RDI, signifying low intakes of these foods rich in vitamin D. Low calcium intake is also associated with low dairy intake, however the claim of low dairy consumption in recovered individuals could not be backed in conjunction with low vitamin D intake because calcium intake was not reported in any of the studies in this review. Previous research found that the recovered individuals' perception of a normal diet had calcium intake levels that were close to the general population but significantly lower than the RDI (Stiles, 2014). While a meta-analysis of 39 studies examining the dietary intake of individuals with active EDs found that vitamin D intake was low compared to the RDI across all 39 studies (Jenkins et al., 2024), indicating low dairy intake may be a persisting eating behaviour found in recovered individuals.

Retinol mainly comes from animal sources such as organ meats, seafood, dairy products, and eggs (Blaner, 2020). Individuals recovered from AN from Patsalos et al.'s (2021) study had significantly low retinol intake compared to the general population and RDI, implying these individuals had low intakes of dairy and meat. Selenium content in foods is largely dependent on selenium content in the soil (Navarro-Alarcon & Cabrera-Vique, 2008). Foods such as chicken, fish, eggs, dairy, and Brazil nuts are rich in selenium content (Chen et al., 2021), however the general population receives most of their dietary selenium from meats and bread (Lei et al., 2022). Recovered individuals from Patsalos et al.'s (2021) study had low selenium intake compared to the general population. This indicates that these recovered individuals consumed less meat, dairy, and other selenium-rich foods

compared to the general population. Sources high in iron include meat, seafood, cereals/grains, legumes, and dark green vegetables (Samaniego-Vaesken et al., 2017; U.S. Department of Agriculture & Agricultural Research Service, 2024; U.S. Department of Agriculture & U.S. Department of Health and Human Services, 2020). Patsalos et al.'s (2021) study found that individuals recovered from AN consumed 15% more iron relative the general population. In conjunction with the findings that recovered individuals consumed adequate amounts of protein, and low amounts of retinol and selenium (Patsalos et al., 2021), higher iron intake found in recovered individuals could imply that recovered individuals eat more legumes than the general population. This is supported by previous research that showed the implication of increased intake of fruits and vegetables (Patsalos et al., 2021), and the high prevalence of vegetarian/vegan dietary patterns in individuals recovered from EDs (Hart et al., 2018). Overall, these findings imply recovered individuals consume adequate amounts of protein from both animal and plant sources. However, low vitamin D, retinol, and selenium intake indicates recovered individuals have lower dairy and meat intake compared to the general population.

The second aim of this review was to investigate the eating behaviours of those who have recovered from EDs. Amongst the ten qualitative studies in our review, the most described eating behaviour was following a “regular” meal pattern whereby individuals recovered from EDs in these studies ate at least three meals per day (Björk & Ahlström, 2008; Björk et al., 2012; Gillespie & Robinson, 2022; Krentz, 2001; O'Byrne, 1993; Platt, 1992; Ulian et al., 2013). To back this finding, previous research reported that recovered individuals perceived a normal diet to consist of three main meals with two to three snacks in between (Stiles, 2014). Establishing a regular meal pattern of at least three meals per day is a recommendation commonly implemented in FBT (Lock, 2011; Sterling et al., 2019) and CBT (Murphy et al., 2010), both of which are first line treatments for EDs.

Individuals recovered from EDs in seven of the qualitative studies included or increased the intake of “high calorie foods” or “desired foods” (Björk & Ahlström, 2008; Björk et al., 2012; Butcher, 2019; Krentz, 2001; O'Byrne, 1993; Tosi et al., 2025; Ulian et al., 2013). In our review, the term “desired food” described foods that were previously avoided or restricted by individuals recovered from EDs such as fatty foods, high sugar foods, fast foods, “unhealthy foods”, and “high calorie foods”.

Previous research found individuals with active EDs to show this cognitive categorisation, labelling foods such as sweets, high fat foods, and fast foods as “unhealthy”, “guilt-inducing”, or “dangerous” (Sunday et al., 1992). The terms “desired foods”, “unhealthy foods”, and “high calorie foods” are synonymous with “fun foods” from the REAL Food Guide and with “treat foods” from Stiles' (2014) study. “Binge foods” or “forbidden foods” were terms used to describe foods that triggered binge episodes for individuals with BED in Krentz's (2001) study.

Previous research shows that individuals recovered from EDs perceived a normal diet to include treat food (e.g. ice cream, chocolate, lollies) and fats (e.g. butter, oil, fried foods) (Stiles, 2014).

Incorporating feared or avoided foods is another key recommendation in ED treatment guidelines including the Plate-by-plate approach (Sterling et al., 2019), CBT, and the REAL Food Guide (Hart et al., 2018). In particular, the REAL Food Guide recommends daily intake of these "fun foods" such as biscuits, ice cream, and lollies as shown in Appendix C.

In addition to including avoided foods in order to break rigid food rules, three of the included studies addressed eating out in social settings, a common anxiety-provoking situation for those with a history of EDs. Individuals recovered from EDs in two studies were comfortable with eating out in social settings which was previously a difficult and often avoided situation due to the lack of control of portion size or type of food (Björk & Ahlström, 2008; Björk et al., 2012). On the other hand, one study reported one individual recovered from AN strongly preferred to only eat what they prepare themselves, while another individual avoided eating with other people because these situations were anxiety-provoking (Ulian et al., 2013). Overall, the eating behaviours of those recovered from EDs in our review were in line with ED treatment guideline recommendations. These recommendations include consuming a meal or snack at regular intervals, incorporating foods previously restricted or avoided, and eating out in social settings.

There are some nuances in eating behaviours between the different types of EDs, more specifically between AN and BN. Individuals recovered from AN focus more on including more foods and eliminating rigid food rules, particularly the avoidance of "fun foods" or "treat foods" (Butcher, 2019; Tosi et al., 2025; Ulian et al., 2013). While, individuals recovered from BED or BN focus more on eating "forbidden foods" in moderation, or even complete avoidance of these "binge foods" during the initial stages of recovery (Krentz, 2001; O'Byrne, 1993).

Despite recovery, individuals in five of the qualitative studies in our review exhibited some form of dietary restraint (Casper et al., 1988; Hansson et al., 2011; Krentz, 2001; O'Byrne, 1993; Ulian et al., 2013). A meta-analysis of 25 studies examining the predictors of relapse in EDs showed that severe dietary restraint was significantly associated with increased likelihood of ED relapse, and higher meal energy density is associated with reduced likelihood of relapse (Sala et al., 2023). This may indicate that recovered individuals who avoided the intake of "fun foods" in four of the included studies were at earlier stages of recovery with eating behaviour compared to the individuals who incorporated "fun foods" in their diet (Casper et al., 1988; Hansson et al., 2011; O'Byrne, 1993; Ulian et al., 2013). In three of the five studies, up to 73% of participants recovered from EDs completely excluded specific types of foods (Casper et al., 1988; Hansson et al., 2011; Ulian et al., 2013). The three studies defined recovery subjectively or through the Morgan-Russell criteria (Morgan & Russell, 1975), therefore these studies did not include psychological or behavioural criteria for recovery. The two other studies included psychological and behavioural criteria for recovery through the DSM criteria and found only one participant in each study to exclude specific foods (Krentz,

2001; O'Byrne, 1993). One participant recovered from BN in O'Byrne et al.'s (1993) study only partially avoided sweets, making exceptions for licorice and cookies. While Krentz et al. (2001) reported one participant recovered from BED to completely avoid sugar. These findings highlight the differences in recovery criteria and are supported by previous literature. A meta-analysis of 18 studies underscored the importance of including criterion measuring psychological well-being in addition to symptom remission when measuring recovery from EDs (de Vos et al., 2017).

Although we initially did not intend to examine Eating Disorder Examination Questionnaire (EDE-Q) scores, we added EDE-Q to our inclusion criteria of the literature search because we identified many studies measuring EDE-Q scores of individuals recovered from EDs. The EDE-Q can be scored as a global score and as separate subscale scores, one of which is dietary restraint. The EDE-Q scores provide descriptive information about ED symptoms, and with regards to the dietary restraint subscale, restraint scores describe an individual's eating behaviours. Four of the five items in the EDE-Q dietary restraint subscale measure the frequency of food limiting and avoidance which are key eating behaviours associated with EDs. The mean EDE-Q restraint score of individuals recovered from EDs in the included eight samples (Dawson et al., 2014; Eddy et al., 2017; Gura-Solomon et al., 2024; Lo Sauro et al., 2013; Romano & Ebener, 2019; Ward et al., 1998) was 1.08, while the EDE-Q restraint score of females in the general population was 1.25 (Fairburn et al., 1993). Except for one sample that had a mean EDE-Q restraint score of 2.17, a score nearly one point higher than the general population, the remaining seven samples had approximately equal or lower scores than the general population. This suggests that these individuals recovered from EDs show restrictive eating behaviours less frequently than the general population. These behaviours include limiting food intake, avoiding eating for long periods, avoiding specific foods, and following dietary rules. Other studies in our review support the finding that recovered individuals show restrictive eating behaviours less frequently. With regards to avoiding eating for long periods of time, seven qualitative studies reported recovered individuals to have regular eating pattern of at least three meals a day (Björk & Ahlström, 2008; Björk et al., 2012; Gillespie & Robinson, 2022; Krentz, 2001; O'Byrne, 1993; Platt, 1992; Ulian et al., 2013). While with avoidance of specific foods and rigid dietary rules, seven studies reported individuals recovered from EDs had included the intake of "high calorie foods" or "desired foods" in their diet (Björk & Ahlström, 2008; Björk et al., 2012; Butcher, 2019; Krentz, 2001; O'Byrne, 1993; Tosi et al., 2025; Ulian et al., 2013). However, the restriction of calories might be a behaviour that individuals recovered from EDs still practice more than the general population. This is because the four studies measuring energy intake in our review found that recovered individuals consume substantially lower energy than the general population.

#### 4.1.1 Strengths and limitations

To our knowledge, this is the first systematic literature review investigating the nutrient intakes and eating behaviours of those recovered from EDs. Considering the high heterogeneity and varying

definitions of recovery, we decided to conduct a narrative synthesis. Employing a narrative synthesis enabled the linking of studies with different methodologies, allowing the inclusion of a broader range of data on dietary intake and eating behaviours. For example, we included all definitions of recovery with the aim of including as many studies as possible. Due to the limited amount of data and high methodological variability, it was not suitable to conduct other types of synthesis such as a meta-analysis. While meta-analyses require studies with large samples, studies with small sample sizes delve deeper into specific or complex contexts which are normally lost in large datasets. This is ideal for a narrative synthesis, whereby qualitative findings (e.g. words and quotes) are gathered to illustrate a series of connected events.

This review had several limitations, both in terms of the included studies and the review process. Previous research has highlighted differences in dietary intake between individuals with active AN, BN, and BED (Jenkins et al., 2024). However, we could not draw conclusions on what micronutrients individuals recovered from BN and BED consume. This is because only one study in the review measured micronutrient intake, and the population sample only included individuals recovered from AN (Patsalos et al., 2021). The methodology of measuring dietary intake was based on dietary recalls, food diaries, and Food Frequency Questionnaires (FFQs). This could lead to potential recall bias where individuals can intentionally or unintentionally misreport their dietary intake. However, this methodological limitation is not limited to our literature review and is a common limitation in studies measuring dietary intake (Bailey, 2021).

There also was a lack of studies on BED as most studies were on individuals recovered from AN, BN, or their OSFED counterparts. Of the included studies, only one study focussed on BED, while in the six studies that included all types of EDs, the samples mainly consisted of AN or BN participants. The limited findings on individuals recovered from BED means the conclusions we drew for EDs in general might not be specific to or apply to individuals recovered from BED.

With the exception of one study that included only males, the samples of the included studies were predominantly female. Even in studies that included both males and females, females made up the overwhelming majority of the sample population. Previous studies suggest there are differences in phenomenology, comorbidities, and behavioural outcomes between males and females (Capuano et al., 2025). Due to the lack of data, we were unable to describe dietary intake and eating behaviour in males recovered from EDs.

Even though EDs usually start manifesting from adolescence (Solmi et al., 2022), most of the included studies (14 out of the 20) had an inclusion criterion of being at least 18 years of age. Even in the studies that did not have an inclusion criteria regarding age, participants were at least 18 years of age except for one study that had an age range of 15-61 years (Hansson et al., 2011).

Therefore, eating in recovered individuals under the age of 18 may look different compared to our findings. The lack of participants under the age of 18 could mean that the course of ED recovery often progresses into adulthood.

Nearly 90% of the included studies took place at an English-speaking country including the UK, US, Sweden, Norway, Canada, and Australia. This lack of diversity was especially the case for studies measuring nutrient intake, as three of the studies were from the US while one was from the UK. In addition to the lack of geographic diversity, all seven studies that reported sample ethnicity found that at least 90% of study participants were Caucasian. The remaining 13 studies did not report sample ethnicity. Currently, there is an urgent call for studies in countries with limited research, notably countries from East Asia. Research found that these countries had the most significant rises in incidence and disability-adjusted life years in the past 30 years (Liu et al., 2025). In addition to this, all 20 studies in this review, except for the one study from Argentina, originated from high income countries according to the World Bank Group classifications (World Bank Group, 2026). The aim of our review was to describe ED studies from various settings and countries so that our findings were a general representation of what and how people recovered from ED eat. However, the lack of geographic diversity in our review makes it difficult to draw conclusions for those living outside of English-speaking and high-income countries.

#### 4.1.2 Practice implications

People who have recovered from an ED are likely to have residual ED behaviours such as restrictive dietary intake, avoidance of specific foods, and avoidance of eating in the presence of others. In turn, addressing disordered eating behaviours after recovery from an EDs may need to involve methods of assessing patient quality of life, attitudes, feelings, and behaviours specific to particular types of EDs. One suggestion we recommend when evaluating the extent of ED recovery in a patient is to use the EDE-Q in conjunction with an FFQ. The EDE-Q misses out on measuring key eating behaviours in those with a history of EDs because most of the items from the EDE-Q are psychological measures. Using an FFQ to describe the dietary intakes of specific foods and food groups, a more complete picture of eating behaviours can be obtained. Behaviours such as the avoidance of specific foods, meal frequency/routine, and eating in the presence of others can be measured. Although the gold standard of measuring dietary intake is through dietary recalls (Bailey, 2021), FFQs do not require an interviewer and can be completed alone, much like the EDE-Q. Questions an FFQ for ED patients should include intake of dairy products, fruits, vegetables, meat, nuts, seeds, oils, fats, treat food (e.g. ice cream, chocolate, lollies), fluids, and diet food and fillers (e.g. low-fat variants, carbonated drinks, sweeteners). An example of an FFQ that an ED clinician could use to measure dietary intake is the Food4Me FFQ (Forster et al., 2014). This FFQ measures frequency of consumption, portion size, supplement use, and additional dietary habits. Measurement of dietary intake can also be used to indirectly measure the avoidance and over-

consumption of certain foods and food groups. Current ED treatment guidelines push the recommendation of three meals a day with snacks in between (Hart et al., 2018; Lock, 2011; Murphy et al., 2010; Sterling et al., 2019), and our review found that individuals recovered from EDs usually follow a regular eating pattern of at least three meals a day. Thus, it would be most beneficial for an FFQ to include questions that measure the number of meals per day and the timing of meals.

Previous research found that many individuals receiving ED treatment do not see a dietitian, often receiving nutrition recommendations from clinicians who do not have the same degree of training and expertise in providing dietary intervention (Roberts et al., 2024). We recommend all clinicians involved in ED research to be familiar with eating guidelines specifically made for ED treatment such as the REAL Food Guide. Although not all clinicians are qualified to provide comprehensive nutritional advice, all ED clinicians must have knowledge of ED specific nutrition recommendations.

Furthermore, ED clinicians should avoid using recommendations from general healthy eating guidelines. Dietary guidelines made for the general population are not intended for those with a history of an ED. Some recommendations in general population guidelines could even be detrimental to these individuals. Especially the recommendations that intend to minimise weight gain such as the avoidance of fats, fatty foods, and high sugar foods. For example, general eating guidelines recommend limiting the intake of foods high in calories from saturated fat and added sugars (U.S. Department of Agriculture & U.S. Department of Health and Human Services, 2020), while the REAL Food Guide recommends having one serve of these foods daily (Hart et al., 2018). Overall, ED treatment should prioritise patient goals and quality of life through a multidisciplinary approach encompassing physical, psychological, and behavioural indices.

#### 4.1.3 Future research

There is a need for future research to advance our understanding of dietary intake and eating behaviours in individuals recovered from EDs. Research investigating both nutrient intakes and serving intakes for each food group is needed. We recommend dietary intake to be measured as an outcome measure at the end of ED treatment, where a FFQ is completed alongside the EDE-Q. At the time of writing this thesis, a meta-analysis measuring the dietary intake of individuals recovered from EDs cannot be produced due to the lack of empirical data, thus calling the need for quantitative studies in this area.

Currently, the vast majority of ED research focuses on females from English-speaking countries over 18 years of age. Future research must address the knowledge gap in underserved groups such as individuals with BED, those from non-English speaking countries, those under 18 years of age,

and males. Research in this area will help to advance our understanding of the health inequities faced by these groups of people.

Currently, dietary intake data of individuals recovered from EDs is difficult to compare with eating guideline recommendations. Measuring food group intake will enable direct comparison to eating guidelines specifically made for EDs such as the REAL Food Guide (Hart et al., 2018). Food group intake data will also inform the validity of the hypotheses of low dairy and meat consumption, as well as high fruit and vegetable consumption. Further research investigating dietary intake in individuals recovered from EDs would enable statistical correlations of dietary intake with recovery psychometrics, which would help identify which specific dietary patterns and eating behaviours will be the most important to target in ED treatment. For example, with more data on dietary intake in recovered individuals, we can establish recommended intakes for energy and macronutrients with the intention of long-term ED recovery. With regards to common eating behaviours, future research could investigate which of these eating behaviours predict recovery and relapse, informing the validity of recommendations in ED treatment guidelines.

Although a previous study has examined the cognitive categorisations of foods in individuals with active EDs (Sunday et al., 1992), there is no study that has defined the terms commonly used to label food at this current time. This review had come across many terms that were misleading or only partially correct. For example, when individuals refer to “high calorie foods” they are most likely referring to burgers, chip, and pizza rather than nuts, seeds, and avocados. This is despite all these foods contain a high amount of calories. Future research could investigate the use of these personal definitions and what individuals recovered from EDs actually mean when they refer to these foods.

Although there is a high prevalence of plant-based eating patterns in individuals with a history of EDs, the relationship between plant-based eating and long-term recovery is under researched in the ED space. Although Hart et al. (2018) does not recommend a vegan eating pattern during the treatment of EDs, Hunter et al. (2024) found that plant-based eating contributed to reduce urges to purge in individuals with EDs. With regards to plant-based eating, our study findings imply that recovered individuals ate more legumes than the general population. Thus, a future study investigating the intake of legumes in individuals recovered from EDs would be interesting.

Some individuals recovered from EDs in our review reported to have persisting eating behaviours that are restrictive or avoidant (e.g. avoiding all sweets, only eating what they prepare themselves, or only eating alone). There is a need for future research to evaluate the impact of these restrictive and avoidant behaviours on relapse risk in individuals recovered from EDs.

## **4.2 Conclusion**

This narrative synthesis set out to investigate the dietary intake and eating behaviour in individuals recovered from EDs. With regards to macronutrient intakes, our review found individuals recovered from EDs had low energy and fat intake compared to the general population. However, protein intake in recovered individuals was adequate compared to the general population and the RDI. With regards to eating behaviour, recovered individuals in our review had regular eating pattern of at least three meals a day and included the intake of previously avoided or restricted foods into their diet. With regards to restrictive eating behaviours such as filling up on vegetables and fruits, low intake of animal products, low energy intake, and low fat intake, individuals recovered from EDs share similar dietary patterns to those with active EDs. Despite sharing similar eating behaviours, eating in individuals recovered from EDs presents itself differently compared to eating in the general population and in individuals with active EDs. We recommend future research to examine this under-researched population to inform ED research, treatment, and relapse prevention.

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## Appendices

### Appendix A: Raw data values for macronutrient intakes compared to general population intakes and recommended daily intakes.

| Author, Year                      | ED | Definition of Recovery | Target Population; Country                    | Study design                     | Participant age; sex; ethnicity; sample size | Main Findings              |                        |                                           |                              |
|-----------------------------------|----|------------------------|-----------------------------------------------|----------------------------------|----------------------------------------------|----------------------------|------------------------|-------------------------------------------|------------------------------|
|                                   |    |                        |                                               |                                  |                                              | Nutrient                   | Study mean intake (SE) | US female 20-29: mean intake <sup>a</sup> | Recommendations <sup>a</sup> |
| Patsalos et al 2021 <sup>bc</sup> | AN | DSM-IV <sup>e</sup>    | F from specialist ED services; United Kingdom | Analytical cross-sectional study | median = 24; 100% F; 96% C; N=23             | Energy (kcal) <sup>g</sup> | 1928.31 (875.55)       | 1939                                      | 1940 <sup>g</sup>            |
|                                   |    |                        |                                               |                                  |                                              | Carbohydrates (g)          | 232.42 (99.08)         | 223                                       | NR <sup>h</sup>              |
|                                   |    |                        |                                               |                                  |                                              | Protein (g)                | 73.61 (34.67)          | 72.7                                      | 36                           |
|                                   |    |                        |                                               |                                  |                                              | Fat (g)                    | 57.43 (35.27)          | 82.2                                      | NR <sup>h</sup>              |
|                                   |    |                        |                                               |                                  |                                              | Saturated fatty acids (g)  | 19.54 (14.91)          | 25.7                                      | NR <sup>h</sup>              |
|                                   |    |                        |                                               |                                  |                                              | Monounsaturated fat (g)    | 21.03 (12.46)          | 27.5                                      | NR <sup>h</sup>              |
|                                   |    |                        |                                               |                                  |                                              | Polyunsaturated fat (g)    | 11.91 (7.34)           | 20.2                                      | NR <sup>h</sup>              |
|                                   |    |                        |                                               |                                  |                                              | Dietary Cholesterol (mg)   | 168.56 (132.23)        | 272                                       | NR <sup>h</sup>              |
|                                   |    |                        |                                               |                                  |                                              | Fibre (g)                  | 23.28 (13.94)          | 16.3                                      | 30                           |
|                                   |    |                        |                                               |                                  |                                              | Retinol/Vitamin A (µg)     | 313.50 (358.19)        | 317                                       | 400                          |
|                                   |    |                        |                                               |                                  |                                              | β-carotene (µg)            | 5701.02 (4846.22)      | 2062                                      | NR                           |
|                                   |    |                        |                                               |                                  |                                              | Thiamine/Vitamin B1 (mg)   | 1.94 (1.11)            | 1.5                                       | 0.6                          |
|                                   |    |                        |                                               |                                  |                                              | Riboflavin/Vitamin B2 (mg) | 1.97 (1.06)            | 1.67                                      | 0.9                          |
|                                   |    |                        |                                               |                                  |                                              | Niacin/Vitamin B3 (mg)     | 22.32 (11.79)          | 23.4                                      | 5.5                          |
|                                   |    |                        |                                               |                                  |                                              | Vitamin B6 (mg)            | 2.12 (1.01)            | 1.87                                      | 0.9                          |
|                                   |    |                        |                                               |                                  |                                              | Vitamin B12 (µg)           | 3.51 (2.87)            | 3.87                                      | 1.25                         |

|                                        |    |                                             |                     |                                            |                                               |                            |                 |       |                 |
|----------------------------------------|----|---------------------------------------------|---------------------|--------------------------------------------|-----------------------------------------------|----------------------------|-----------------|-------|-----------------|
| Casper<br>et al<br>1998 <sup>bd</sup>  | AN | Morgan-<br>Russell<br>criteria <sup>f</sup> | F; United<br>States | Non-<br>randomized<br>trial                | median =24.3;<br>100% F; NR;<br>N=19          | Vitamin C (mg)             | 142.01 (91.63)  | 84    | 25              |
|                                        |    |                                             |                     |                                            |                                               | Vitamin D (µg)             | 2.11 (1.82)     | 3.8   | 10 <sup>i</sup> |
|                                        |    |                                             |                     |                                            |                                               | Vitamin E (mg)             | 15.44 (7.89)    | 9.9   | 5               |
|                                        |    |                                             |                     |                                            |                                               | Folate (µg)                | 375.31 (209.03) | 436   | 150             |
|                                        |    |                                             |                     |                                            |                                               | Iron (mg)                  | 13.22 (6.54)    | 11.5  | 6.7             |
|                                        |    |                                             |                     |                                            |                                               | Magnesium (mg)             | 388.72 (202.81) | 280   | 200             |
|                                        |    |                                             |                     |                                            |                                               | Selenium (µg)              | 54.35 (27.31)   | 106.8 | 60              |
|                                        |    |                                             |                     |                                            |                                               | Zinc (mg)                  | 8.67 (4.35)     | 9.1   | 5.5             |
|                                        |    |                                             |                     |                                            |                                               | Energy (kcal) <sup>g</sup> | 1290            | 1939  | 2000            |
| Dellava<br>et al<br>2011 <sup>bd</sup> | AN | DSM-IV ≥ 3<br>yrs                           | F; United<br>States | Analytical<br>cross-<br>sectional<br>study | mean = 32.5;<br>100% F;<br>Largely C;<br>N=15 | Carbohydrates (g)          | 159.1           | 72.7  | 46              |
|                                        |    |                                             |                     |                                            |                                               | Energy (kcal) <sup>g</sup> | 1942 (543)      | 1939  | 2000            |
| Elmore<br>et al<br>1991 <sup>bd</sup>  | BN | DSM IIIr                                    | F; United<br>States | Analytical<br>cross-<br>sectional<br>study | mean = 22;<br>100% F; NR;<br>N=12             | Energy (kcal)              | 1734            | 1939  | 2000            |

Note: ED = eating disorder; SE = standard error; AN = Anorexia Nervosa; DSM-IV = Diagnostic and Statistical Manual of Mental Disorders, Fourth Edition; F = females, C = Caucasian, yr = years; N = number of study participants; NR = not reported; DSM IIIr = Diagnostic and Statistical Manual of Mental Disorders, Third Edition, Revised; BN = Bulimia Nervosa.

<sup>a</sup>Red <80% of recommendations, Green = 80 to 120% of recommendations, Blue >120% of recommendations.

<sup>b</sup>Figures for mean intake consumed by females aged 20 to 29 years were obtained from U.S. Department of Agriculture and Agricultural Research Service (2024). Nutrient Intakes from Food and Beverages: Mean Amounts Consumed per Individual, by Male/Female and Age, *What We Eat in America*, NHANES August 2021-August 2023.

<sup>c</sup>Figures for RDI were obtained from Department of Health (1991). Dietary Reference Values A Guide, HMSO, 1991. These recommendations were intended for females aged 19 to 49 years.

<sup>d</sup>Figures for RDI were obtained from U.S. Department of Agriculture and U.S. Department of Health and Human Services (2020). Dietary Guidelines for Americans, 2020-2025. 9th Edition. December 2020. These recommendations were intended for females aged 19 to 30 years with a reference height of 5 foot and 4 inches (162.56 cm) and reference weight of 126 pounds (57.15 kg).

<sup>e</sup>DSM-IV = Diagnostic and Statistical Manual of Mental Disorders, 4<sup>th</sup> Edition; participants in this category no longer meet the criteria for their respective ED.

<sup>f</sup>Participants who met good outcome criteria according to Morgan and Russell (1975). Good — average weight for height, sex, and age (100±15% average body weight), and regular cyclical menstruation; Intermediate — average or near average weight for height, sex, and age (85-100% average body weight), and/or continued menstrual disturbances; Poor — constantly low body weight (<85% average body weight), and menstrual abnormalities.

<sup>g</sup>Energy figures assume a Physical Activity Level of 1.4 which is applicable to most people and represents low levels of physical activity at work and leisure.

<sup>h</sup>RDI for carbohydrates and fat were not reported by the Department of Health (1991). Dietary Reference Values A Guide, HMSO, 1991. These recommendations were intended for females aged 19 to 49 years.

<sup>i</sup>Due to lack of RDIs reported by Department of Health (1991), these figures were obtained from Public Health England (2016). Government recommendations for energy and nutrients for males and females aged 1–18 years and 19+ years. These recommendations were intended for females aged 19 to 64 years.

## Appendix B: Literature review search strategies.

We performed a literature search across five databases: Scopus, Pubmed, MEDLINE via Ovid 1966 to present, ProQuest Dissertations and Theses, and PsycInfo. Listed below are the search strategies and terminologies used for each database. These search strategies were developed in consultation with a specialist university librarian with expertise across all databases searched. No study design, date, or language limits were applied to the search.

| Database                         | Query                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
|----------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Scopus                           | ("eating disorder*" OR "anorexia nervosa" OR anorexi* OR "bulimia nervosa" OR bulimi* OR "binge eating disorder*" OR "binge eating" OR binge* OR binging OR "feeding disorder*" AND recover* OR remission OR rehabilitat* OR restore* OR restorat* AND food* OR diet* OR nutrition* OR micronutrient* OR macronutrient* OR nutrient* OR behaviour* OR behavior* OR eat* OR "food group" AND NOT (bacteria* OR rat OR rats OR mice OR mouse* OR animal* OR drug* OR inject* OR genetic*))                                                                                                                                                                                                         |
| Pubmed                           | ("eating disorder*" OR eating disorder OR "anorexia nervosa" OR anorexia nervosa OR anorexi* OR "bulimia nervosa" OR bulimia nervosa OR bulimi* OR "binge eating disorder*" OR binge eating disorder OR "binge eating" OR binge* OR binging OR "feeding disorder*") AND (recover* OR remission OR rehabilitat* OR rehabilitation OR restore* OR restorat*) AND (food* OR food OR diet* OR diet OR nutrition* OR nutrition OR micronutrient* OR micronutrient OR macronutrient* OR macronutrient OR nutrient* OR behaviour* OR behaviour OR behavior* OR behavior OR eat OR "food group") NOT (bacteria* OR bacteria OR rat OR rats OR mice OR mouse OR animal* OR animal OR inject* OR genetic*) |
| MEDLINE via Ovid 1966 to present | ((("Feeding and Eating Disorders" or Anorexia Nervosa or Binge-Eating Disorder or Bulimia Nervosa or Disordered Eating Behavior or "Feeding and Eating Disorders of Childhood") and (recover* or remission or rehabilitat* or rehabilitation or restore* or restorat*) and ("Diet, Food, and Nutrition" or food* or Food or diet* or Diet or nutrition* or nutrient* or Nutrients or micronutrient* or Micronutrients or macronutrient* or behaviour* or behaviour or behavior* or behavior Behavior or Disordered Eating Behavior or Feeding Behavior or Health Behavior or eat or "food group")) not (bacteria* or rat or rats or mice or mouse or animal* or inject* or genetic*))            |
| ProQuest                         | ((noft("eating disorder*" OR "anorexia nervosa" OR anorexi* OR "bulimia nervosa" OR bulimi* OR "binge eating disorder*" OR "binge eating" OR binge*                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |

|           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
|-----------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| PsychInfo | <p>OR binge OR "feeding disorder*") AND noft(recover* OR remission OR rehabilitat* OR restore* OR restorat*) AND noft(food* OR diet* OR nutrition* OR micronutrient* OR macronutrient* OR nutrient* OR behaviour* OR behavior* OR eat* OR "food group") NOT noft(bacteria* OR rat OR rats OR mice OR mouse OR animal* OR inject* OR genetic* OR pharmacologic*)) AND stype.exact("Scholarly Journals" OR "Dissertations &amp; Theses")) AND stype.exact("Scholarly Journals" OR "Dissertations &amp; Theses")) AND stype.exact("Scholarly Journals" OR "Dissertations &amp; Theses")</p> <p>("eating disorder*" OR DE "Feeding Disorders" OR DE "Eating Disorders" OR "anorexia nervosa" OR anorexi* OR DE "Anorexia Nervosa" OR "bulimia nervosa" OR bulimi* OR DE "Bulimia" OR "binge eating disorder*" OR "binge eating" OR binge* OR binge OR DE "Binge Eating" OR DE "Binge Eating Disorder" OR "feeding disorder*") AND (recover* OR remission OR rehabilitat* OR restore* OR restorat* OR DE "Remission (Disorders)" OR DE "Symptom Remission" OR DE "Recovery (Disorders)") AND (food* OR diet* OR nutrition* OR micronutrient* OR macronutrient* OR nutrient* OR behaviour* OR behavior* OR DE "Eating Behavior" OR eat* OR "food group") NOT (bacteria* OR rat OR rats OR mice OR mouse* OR animal* OR inject* OR genetic*))</p> |
|-----------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|

### Appendix C: Differences between recommended servings for each food group in eating guidelines.

Carbohydrate portion sizes are different in the REAL Food Guide compared with general population guidelines (Hart et al., 2018). The REAL Food Guide recognises two slices of bread as one serving of carbohydrate foods, while the Eating and Activity Guidelines for New Zealand Adults (EAGNZA) and Dietary Guidelines for Americans (DGA) recognise one slice of bread as one serving of grain (carbohydrates) foods (Ministry of Health, 2020; U.S. Department of Agriculture & U.S. Department of Health and Human Services, 2020). Most recommended serving sizes of food groups operate so the average person has one serve per meal such as having one serving of protein foods at every meal. However, the EAGNZA and DGA recommend six serves of carbohydrates per day which is equivalent to two servings of carbohydrates at every meal. This can create a psychological effect that an individual is eating more than what is required in a day. This contrasts with the recommendation of having one serve of carbohydrates at every meal (e.g. two slices of bread or one cup of cooked rice), whereby individuals can intuitively recognise three servings as the baseline.

Additionally, general population guidelines do not include fun/treat foods or fats and oils as a distinct food group like the recommendations in the REAL Food Guide. Rather, guidelines such as the EAGNZA and DGA recommends limiting the consumption of fun/treat foods and fats and oils. This gives the impression that healthy diets do not have room for these foods and that avoidance of these foods can be considered a healthy behaviour.

**Table C1: Daily amount recommended for each food group using serving sizes from the Recovery from Eating Disorders for Life Food Guide.**

| Food Group                                            | EAGNZA 2020 <sup>a</sup> | DGA 2020 <sup>b</sup> | REAL Food Guide <sup>c</sup> |                    |
|-------------------------------------------------------|--------------------------|-----------------------|------------------------------|--------------------|
|                                                       |                          |                       | Weight maintenance serves    | Weight gain serves |
| Vegetables<br>(e.g. ½ cup carrots, 1 cup spinach)     | 5                        | 5                     | 4                            | 4                  |
| Fruit<br>(e.g. 1 orange, 2 tbsp raisins, 1 cup juice) | 2                        | 2                     | 2                            | 4                  |

|                                                                                            |       |       |             |             |
|--------------------------------------------------------------------------------------------|-------|-------|-------------|-------------|
| Carbohydrate foods<br>(e.g. 2 slices bread, ½ cup cooked oats, 1 cup rice)                 | 3     | 3     | 3           | 4           |
| Protein foods<br>(e.g. ½ cup grated cheese, ¾ cup beef mince, 1 cup tofu)                  | 2.5   | 2     | 2           | 2           |
| Calcium foods<br>(e.g. 1 cup milk, 1 cup yoghurt)                                          | 2.5   | 3     | 3           | 4           |
| Nuts, oils & fats<br>(e.g. 1 tsp oil, 2 tsp butter, 1 tbsp avocado)                        | NR    | 2     | 2           | 4           |
| Fun/treat foods<br>(e.g. 3 chocolate coated biscuits, 3 scoops ice cream, 1/3 cup lollies) | Limit | Limit | 1           | 1           |
| Fluids<br>(e.g. water, tea, coffee, juice)                                                 | 2.1 L | NR    | 1.5 – 2.0 L | 1.5 – 2.0 L |

Note: EAGNZA = Eating and Activity Guidelines for New Zealand Adults; DGA = Dietary Guidelines for Americans; REAL Food Guide = Recovery from Eating Disorders for Life Food Guide; NR = Not Reported

<sup>a</sup> Ministry of Health. (2020). Eating and Activity Guidelines for New Zealand Adults: Updated 2020. Wellington: Ministry of Health. Ministry of Health. 2020. Eating and Activity Guidelines for New Zealand Adults: Updated 2020. Wellington: Ministry of Health.

<sup>b</sup> U.S. Department of Agriculture and U.S. Department of Health and Human Services. (2020). Dietary Guidelines for Americans, 2020-2025. 9th Edition. December 2020.

<sup>c</sup> Hart, S., Marnane, C., McMaster, C., & Thomas, A. (2018). Development of the “Recovery from Eating Disorders for Life” Food Guide (REAL Food Guide)-a food pyramid for adults with an eating disorder. Journal of eating disorders, 6(1), 6.

## Appendix D: Quotes from recovered individuals from studies included in literature review and the associated eating behaviours.

| Source           | Quote                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | Associated eating behaviours                                                                                                               |
|------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------|
| Björk et al 2008 | I feel healthy and feel I can eat anything at all and needn't be afraid to have whatever I fancy. Oh, it's lovely to just go and sit down and look at the menu and choose something without having to go and worry about how they've done it. Nowadays I can enjoy a proper meal—what a difference that makes! I believe in eating everything and in normal portions. (Amanda)                                                                                                                                                                                           | <ul style="list-style-type: none"> <li>– Regular eating pattern</li> <li>– Eating what one desires</li> </ul>                              |
| Björk et al 2008 | I have breakfast, lunch, dinner, and two snacks in between, and it's always the food plate model. I eat very well—often too well, perhaps. ... A lot of times I feel this regular pattern of mine isn't healthy. It's not normal that it always has to be 12:00, 3:00, 6:00 or whatever—you need to be able to modify things a bit now and then, and I suppose that's what I'm working at most at the moment. When you have children, as I do, it's anyway very hard to say that at 3:00 I eat and everything else can wait, because it doesn't work like that. (Kim)    | <ul style="list-style-type: none"> <li>– Regular eating pattern</li> <li>– Flexible eating times</li> </ul>                                |
| Björk et al 2008 | Now I eat everything and I'm very interested in food—not special low calorie but varied, with fruit and vegetables, and candy at the weekend. Not that I cut out fatty food so much—I have candy and I have a snack with my coffee and that, and I can handle it and I feel fine. (Lisa)                                                                                                                                                                                                                                                                                 | <ul style="list-style-type: none"> <li>– Eating without restriction of quantity or variety of foods</li> </ul>                             |
| Björk et al 2008 | Well, I've just had lunch with a pal of mine, and that was great. And I didn't have to pay the price by feeling bad after—I don't feel bad at all. (Alex)                                                                                                                                                                                                                                                                                                                                                                                                                | <ul style="list-style-type: none"> <li>– Eating in a social setting</li> </ul>                                                             |
| Björk et al 2008 | If you're offered something, it's okay to say no thanks just as much as it's okay to say yes please. You don't need to say yes please, eat up, and then leave as fast as hell. You can eat, you can enjoy eating, and you can eat a bit less, and you can see it as okay to enjoy your food. There doesn't have to be a frenzy when it comes to food, the way there used to be (and which was exceptionally dangerous), and there's no more need to worry a whole week if you've been invited somewhere and have no control over the food that's to be offered. (Amanda) | <ul style="list-style-type: none"> <li>– Eating without restriction of quantity or variety of foods</li> <li>– Intuitive eating</li> </ul> |
| Björk et al 2012 | I'm not able to react to what I want at the moment. Instead, I'll eat breakfast, I'll eat snacks between meals, or I'll eat lunch and dinner. One might say that this meals routine is what runs my life, but it's not. It's to keep the sickness under control. (Philip, 31 years, BN)                                                                                                                                                                                                                                                                                  | <ul style="list-style-type: none"> <li>– Regular eating pattern</li> </ul>                                                                 |
| Björk et al 2012 | For me, being recovered today means not going to the grocery store, walking around and looking at what everything contains. It's just, do I want this? If I want to have chocolate then I actually buy chocolate. If I want a pizza, then I go and buy a pizza ... for me it's the freedom. (Patric, 24 years, AN and later BN)                                                                                                                                                                                                                                          | <ul style="list-style-type: none"> <li>– Eating what one desires</li> </ul>                                                                |
| Björk et al 2012 | Food is no longer a problem. I've left that behind me. But I will always have a strained relationship with food. By strained I mean that I'm aware of what I eat and how much, but not as I was before when I would skip dinner or avoid social gatherings where food was involved. Or I would quickly go out for a run so that I deserved to eat. I don't think that way anymore. I am much more relaxed now and when spending time with others, I don't think about it (food). (Paul, 42 years, AN)                                                                    | <ul style="list-style-type: none"> <li>– Eating in a social setting</li> </ul>                                                             |
| Butcher 2019     | I didn't mind having a belly, which is so bizarre because of the eating disorder. So I just, I didn't mind having this belly. ... I was just like—you know what? I'm pregnant and I eat bagels and cream cheese literally every day and it's awesome. It's what I'd been missing out on all these years when I was like so miserable and skinny. (Kaitlyn)                                                                                                                                                                                                               | <ul style="list-style-type: none"> <li>– Eating what one desires</li> </ul>                                                                |

|                           |                                                                                                                                                                                                                                                                                                                                                                                  |                                                                                           |
|---------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------|
| Butcher 2019              | When asked to describe the most enjoyable parts of pregnancy, Kaitlyn stated, "Ironically, eating whatever I wanted," (Kaitlyn).                                                                                                                                                                                                                                                 | – Eating without restriction of quantity or variety of foods                              |
| Butcher 2019              | "I really ate so many bagels and so many French fries when I was pregnant which was like something that I never even thought imaginable when I had an eating disorder" (Kaitlyn).                                                                                                                                                                                                | – Eating what one desires<br>– Eating without restriction of quantity or variety of foods |
| Butcher 2019              | I don't really love eating meat. I do eat it sometimes, it's just not my preference, I'm more of a vegetarian type, but when I was pregnant I wanted to eat meat, and a lot more of higher fat higher protein foods, which I did. I just really enjoyed them and wanted them. (Naomi)                                                                                            | – Eating what one desires                                                                 |
| Gillespie & Robinson 2022 | Valentine explained, "I still eat breakfast snack lunch snack dinner snack, to eat every few hours." Yoshi wrote, "I just got back into a regular pattern and stuck with it." Sam's experience was more gradual: "As I progressed in recovery (and with the help and support of my dietitian) I was able to wean off a prescribed meal plan and learn to intuitively eat again." | – Regular eating pattern                                                                  |
| Krentz 2001               | ... 3 meals a day, and I didn't restrict on any specific foods. Like if I wanted to eat chocolate at one of my meals then that's what I ate, I didn't cut anything out. And that seemed really important to me, because as soon as I would try to cut something out I would obsess about it.                                                                                     | – Regular eating pattern<br>– Eating without restriction of quantity or variety of foods  |
| Krentz 2001               | [No] sugar because.. it would be really nice if I could have a spoonful of chocolate pudding, or if I could have a chocolate bar. But that's not what happens for me, I don't stop at one, I just keep right on going.                                                                                                                                                           | – Eating what one desires<br>– Avoiding forbidden foods                                   |
| O'Byrne 1993              | Not really anything except to recognize if I'm eating too much... Now I rarely eat between meals. I eat three meals a day... Just being conscious of what I eat                                                                                                                                                                                                                  | – Regular eating pattern                                                                  |
| O'Byrne 1993              | I enjoy eating everything; I don't exclude anything from my diet anymore.                                                                                                                                                                                                                                                                                                        | – Intuitive eating<br>– Eating without restriction of quantity or variety of foods        |
| O'Byrne 1993              | I try to stay away from sweets. Licorice and cookies are a weakness, but that's O.K. as long as I don't eat the whole bag, that's O.K. It is alright to treat myself.                                                                                                                                                                                                            | – Avoiding forbidden foods                                                                |
| Tosi et al 2025           | "I'm no longer so fixated on the portion size or type of food I'm having during a meal, which used to be such a big deal for me before" (Participant 3)                                                                                                                                                                                                                          | – Eating what one desires                                                                 |
| Tosi et al 2025           | "I started eating not just to survive, but for the pleasure of eating" (Participant 14), or "Sometimes I eat a little more because I enjoy eating" (Participant 10).                                                                                                                                                                                                             | – Eating what one desires                                                                 |

