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Associations between vegetarianism, body mass index, and eating disorders/disordered eating behaviors: A systematic review of literature

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Abstract

The vegetarian diet is becoming increasingly popular among the general population and has been accompanied by an increasing number of publications in the last twenty years. However, the spread of selective diets raises some questions, especially with regard to health. This review examines studies on vegetarianism published between 2000 and 2022 that investigated the associations between this diet, weight, and eating disorders. The descriptive studies conclude that vegetarians have a lower body mass index, and the interventional studies show the value of a vegetarian diet for weight loss. While some studies suggest that vegetarianism may be associated with orthorexia nervosa, the results regarding the association between vegetarianism and eating disorders are more heterogeneous and depend on the type of samples and dimensions studied. The heterogeneity of these findings is discussed in light of the methodological limitations of the studies to provide perspectives for future research.

Keywords: body mass index, obesity, anorexia nervosa, orthorexia nervosa, diet.

1. Introduction

Psychological research on vegetarianism in the broad sense has been a flourishing and growing field for the last decades. However, the diversity of dietary practices and the inappropriate use of the terminology “vegetarian” in research make it more difficult to obtain a clear and universal definition of vegetarianism and, especially, establish clear associations with psychological dimensions (Kessler et al. 2016). Indeed, vegetarian diets vary considerably depending on the animal products consumed. Moreover, among the individuals who identify as vegetarians, a certain number allow themselves to occasionally consume meat products (Mathieu and Dorard 2016; Rothgerber 2017). In this context, vegetarianism is a term that encompasses a wide range of dietary habits that oscillate on a continuum of more or less broad restrictions on the consumption of animal products (Forestell et al. 2012; Mathieu and Dorard 2016; Forestell 2018; Rosenfeld 2018).

The vegetarian diet is characterized by the exclusion of meat products, fish, and seafood (The Academy of Nutrition and Dietetics 2016), and different terminology is available depending on the inclusion of dairy products (lacto-vegetarianism), eggs (ovo-vegetarianism), or both types of food and their derivatives (ovo-lacto-vegetarianism). The vegan diet is distinguished by the exclusion of any product resulting from animal exploitation, such as honey. Other terms have appeared in the literature, including semi-vegetarianism and flexitarian diet. The flexitarian diet is characterized by the limited but not prohibited consumption of meat (Corrin and Papadopoulos 2017; Forestell 2018; Rosenfeld 2018), while semi-vegetarianism is defined by the non-consumption of red meat but the possible consumption of other types of meat, such as poultry (pollo-vegetarianism) or fish (pesco-vegetarianism; Mullee et al., 2017; Heiss & Hormes, 2018; Rosenfeld, 2018). Thus, on the continuum of vegetarian diets, flexitarianism is the least restrictive end and veganism the most restrictive (Corrin and Papadopoulos 2017; Rosenfeld 2018).

Much epidemiological data is available concerning the prevalence of vegetarianism. The numbers vary significantly across countries, ranging from approximately 1% in China, Italy, and New Zealand (Bidwell 2002; Mao et al. 2015; Ponzio et al. 2015) to over 33% in South Asia (Agrawal et al. 2014), with a peak of 40% in India (Rothgerber 2015). If the prevalence of veganism is less studied, the literature reports rates ranging from 1% to 2% in the US, Germany, Australia, and the UK (Department for Environment, Food & Rural Affairs 2007; Newport 2012; VVSQ 2012; VEBU,- 2014). Finally, although the number of flexitarians likely far exceeds the number of vegetarians, few epidemiological data exist for this type of diet. However, people currently associate more easily with flexitarianism than with vegetarianism or veganism (VeganZ 2020), with an estimated 10% to 37% doing so depending on the methodology used (Rosenfeld and Burrow 2017; The Vegetarian Resource Group 2022).

Like the definitions of vegetarianism, individuals' motives for adopting and pursuing a vegetarian diet (in the broad sense) are varied. Although studies recognize that most vegetarians are not driven by a single motivation but rather by a complex interaction of motivations (Beardsworth and Keil 1992; Janssen et al. 2016; Rosenfeld and Burrow 2017a, 2017b), the two most frequently reported are ethics, particularly a concern for animal welfare, and health (Ruby 2012; Rosenfeld 2018). This last category includes interest in the benefits for physical health, the prevention of possible diseases, the reduction of physical discomfort, and control over the body (losing or not gaining weight; Hoffman et al. 2013; Radnitz et al. 2015; Cramer et al. 2017; Rosenfeld 2018). Health motivation is a kind of general promotion of inner and outer physical well-being.

While health seems to be the main motivation for some vegetarians (Dyett et al. 2013; Rosenfeld 2019), most studies indicate that a greater proportion of vegetarians are more ethically motivated than health motivated (Hoffman et al. 2013; Rothgerber 2014; Radnitz et al. 2015; Janssen et al. 2016). Whatever the reasons expressed (ethics and/or health), some

authors have suggested that this diet may be a socially acceptable way to avoid the consumption of certain foods to control and/or maintain weight (Baş et al. 2005; Dyett et al. 2013). This has led clinicians and researchers to question the possible links between vegetarianism and nutritional pathologies and eating disorders (EDs). The systematic reviews and meta-analyses in the literature have so far focused on vegetarianism in connection with either chronic diseases, weight, or EDs (Bennett and Appel 2016; Kahleova, Levin, et al. 2018; Joshi et al. 2020; Sergentanis et al. 2020). Due to the methodology used, some studies were excluded from the selection to allow generalization of the results. However, the field of vegetarianism research is vast, and the methodologies are diverse. Therefore, the objective of this overview is to jointly address the associations between vegetarianism, body mass index, and EDs, to update and deepen the knowledge on this topic. In this perspective, studies were selected to be as comprehensive as possible in order to identify the limits most commonly found.

2. Method

2.1. Studies selection

Articles published between 2000 and 2022 were searched in three electronic databases (PsycINFO, PubMed, and Embase) between January and November 2022. The search was restricted to scientific articles written in English and published in peer-reviewed journals. Each database was explored with the same combination of keywords: “vegetarian” OR “vegetarianism” OR “vegan” OR “veganism” OR “plant-based diet” OR “vegetable diet” AND “body mass index” OR “underweight” OR “overweight” OR “weight” AND/OR “eating disorders” OR “anorexia nervosa” OR “bulimia nervosa” OR “hyperphagia” OR “binge eating” OR “overeating” OR “orthorexia” OR “cognitive restraint” OR “dietary restraint.” All search results were saved on the Zotero reference manager. After removing all duplicates, the studies were reviewed based on titles and abstracts. The reference lists of eligible articles and relevant

journals were also explored to identify other studies on vegetarian diets, BMI, and EDs not registered in the three databases.

2.2. Inclusion criteria

The search was limited to human studies where the article was fully accessible. Only articles published after 2000 were considered. This selection was partly motivated by changes in methodology, particularly the more open selection of vegetarian participants during this period. Indeed, many older studies recruited vegetarian participants from religiously colored entities (e.g., Seventh-Day Adventists; Nieman et al., 1989; Key et al., 1999), contributing to skewing the observed associations between eating behaviors and other psychological variables. Articles published after 2000 but covering similar samples (e.g., Buddhists, Orthodox communities) were also excluded. In addition, studies of premenopausal, pregnant, and lactating women were excluded because of possible hormonal effects on metabolic measures such as weight. Additionally, studies on children were not included as feeding is highly dependent on parental choice. Finally, studies conducted in India, where vegetarianism is practiced for traditional and cultural reasons, were not included.

2.3. Inclusion summary

The search yielded 133 eligible articles published between 2000 and 2022 ([Figure 1](#)). The studies in question were either cross-sectional or prospective. Sample sizes varied widely, ranging from 18 to 229,806. Samples included patients with an ED, individuals with a selective diet, or individuals participating in a weight-loss diet program. Most studies were mixed-genre, but the genre ratio was unbalanced, with predominantly female sample; 30 studies included only women and 3 included only men.

3. Results

3.1. Vegetarianism and Body Mass Index

3.1.1. Observational studies

The characteristics of the selected cross-sectional studies reporting the effects of a vegetarian diet on weight and BMI are presented in [Table 1](#). Of the 48 studies examined, 33 indicate that vegetarians at large have a lower BMI than omnivores regardless of gender or age group (Smith et al. 2000; Cade et al. 2004; Chang-Claude et al. 2005; Fontana et al. 2005; Newby et al. 2005; Fontana et al. 2007; Farmer et al. 2011; Wu et al. 2011; Gammon et al. 2012; Timko et al. 2012; Yang et al. 2012; Rizzo et al. 2013; Burkert et al. 2014; Kim and Bae 2015; Jaacks et al. 2016; Ou et al. 2016; Acosta-Navarro et al. 2017; Chen et al. 2018; Jin et al. 2018; Tong et al. 2018; Wirnitzer et al. 2018; Cui et al. 2019; Haggmann et al. 2019; Norwood et al. 2019; Papier et al. 2019; Tong et al. 2019; Brytek-Matera 2020a; Paslakis et al. 2020; Tong et al. 2020; Zickgraf et al. 2020; Dorard and Mathieu 2021; Hessler-Kaufmann et al. 2021; Jakše et al. 2021). Two other studies obtained more nuanced results by gender, observing a difference in BMI among men only (Nakamoto et al. 2008), and by age group, finding a difference in BMI among 19- to 23-year-olds but not among 15- to 18-year-olds (Robinson-O'Brien et al. 2009).

Studies that differentiate between individuals based on the degree of dietary restriction show that with increased selectivity of the diet, the BMI decreases (Burkert et al., 2014; Haggmann et al., 2019; Newby et al., 2005; Papier et al., 2019; Tong et al., 2020). Finally, 11 studies report that the prevalence of overweight and/or obesity is lower among vegetarians in general (Hoffmann et al. 2001; Newby et al. 2005; Robinson-O'Brien et al. 2009; Rizzo et al. 2013; Jaacks et al. 2016; Chang et al. 2019; Cui et al. 2019; Haggmann et al. 2019; Parra-Fernández et al. 2020; Paslakis et al. 2020; Tong et al. 2020), and more specifically, the

prevalence is lowest among strict vegetarians and vegans and highest among non-vegetarians (Timko et al. 2012; Rizzo et al. 2013; Burkert et al. 2014).

3.1.2. Interventional studies

Forty interventional studies were identified that addressed the introduction of a vegan or lacto-ovo-vegetarian diet, either “pure” or compared to an omnivorous diet, as a baseline or as part of a weight-loss program ([Table 2](#)). Most studies show (with and without a control group) that switching to a low-fat, plant-based, or lacto-ovo-vegetarian diet as a dietary intervention can lead to weight loss (Karttinen et al. 2000; Turner-McGrievy et al. 2004; Burke et al. 2006; Turner-McGrievy et al. 2007; Elkan et al. 2008; Barnard, Cohen, et al. 2009; Chainani-Wu et al. 2011; Kahleova et al. 2011; Acharya et al. 2013; Kent et al. 2013; McDougall et al. 2014; Turner-McGrievy et al. 2015; Yadav et al. 2016; Jakše et al. 2017; Wright et al. 2017; Barnard et al. 2018; Kahleova, Dort, et al. 2018; Kahleova, Fleeman, et al. 2018; Kahleova, Levin, et al. 2018; Rogerson et al. 2018; Shah et al. 2018; Sofi et al. 2018; Campbell et al. 2019; Jakše et al. 2019; Dinu et al. 2020; Kahleova et al. 2020; Chiarioni et al. 2021; Garousi et al. 2021 Mar 9) and has a positive impact on weight status, leading to, for example, an end to overweight or obesity (Karttinen et al. 2000; Kent et al. 2013; Jakše et al. 2019).

More significant weight loss was observed in studies reporting higher weight at baseline (Turner-McGrievy et al. 2004; Burke et al. 2008; Acharya et al. 2013; Wright et al. 2017) or a longer intervention (Burke et al. 2008; Acharya et al. 2013; Jenkins et al. 2014; Wright et al. 2017) and in studies specifically targeting weight loss (Barnard et al. 2005; Burke et al. 2008; Turner-McGrievy et al. 2015; Sofi et al. 2018; Kahleova et al. 2020). Implementing other diet plans can also result in significant weight loss over time. Indeed, some studies indicate a significantly greater effect of a vegan diet (Turner-McGrievy et al. 2004; Barnard et al. 2005; Turner-McGrievy et al. 2007; Elkan et al. 2008; Kahleova et al. 2011; Mishra et al. 2013;

Turner-McGrievy et al. 2015; Jakše et al. 2017; Lee et al. 2017; Wright et al. 2017; Rogerson et al. 2018; Kahleova et al. 2020; Barnard et al. 2021; Garousi et al. 2021), while others find no difference between vegan and omnivorous diets for weight loss (Burke et al. 2006; Burke et al. 2008; Barnard, Cohen, et al. 2009; Acharya et al. 2013; Neacsu et al. 2014; Barnard et al. 2018; Shah et al. 2018; Sofi et al. 2018; Campbell et al. 2019; Dinu et al. 2020).

3.2. Vegetarianism, disordered eating psychopathology, and orthorexia

To investigate the associations between vegetarianism and disordered eating psychopathology, studies were conducted with and without standardized measures ([Table 3](#)).

3.2.1. Studies without standardized measures of disordered eating psychopathology

Three studies did not use standardized measures to assess disordered eating psychopathology (Perry et al. 2001; Robinson-O'Brien et al. 2009; Estima et al. 2012). Robinson and colleagues (2009) showed that vegetarian adolescents reported more binge-eating episodes with loss of control than non-vegetarians, and that vegetarians were more likely to engage in unhealthy weight-control behaviors (e.g., fasting, excessive exercise, vomiting, use of laxatives) than non-vegetarians (as also reported by Perry et al.'s, 2001). However, the study by Estima and colleagues (2012) did not confirm these findings: while binge-eating episodes were the most commonly reported dysregulated eating behavior in the sample population (10.3% of 1,167 adolescents aged 14 to 19 years), no difference was observed between vegetarians and omnivores. However, the number of vegetarians was relatively low compared with omnivores (48 versus 1,119).

3.2.2. Studies with standardized measures of disordered eating psychopathology

Many studies have used standardized measures to quantify disordered eating psychopathology, whether pathological or not, in individuals who avoid eating meat. These mainly include the Eating Disorder Examination Questionnaire (EDE-Q; Timko et al. 2012; Zuromski et al. 2015; Heiss et al. 2017; Heiss et al. 2018; Heiss et al. 2019; Paslakis et al. 2020; Zickgraf et al. 2020; McLean, Lavale, et al. 2022; McLean, Moeck, et al. 2022), the Eating Attitudes Test (EAT; Lindeman et al. 2000; Klopp et al. 2003; Baş et al. 2005; Fisak et al. 2006; Forestell et al. 2012; Timko et al. 2012; Çiçekoğlu and Tunçay 2018; Fatima and Ahmad 2018; Dorard and Mathieu 2021; McLean, Moeck, et al. 2022), the Dutch Eating Behavior Questionnaire (DEBQ; Fisak et al. 2006; Timko et al. 2012; Heiss et al. 2017; Hanras, Boujut, et al. 2022), the Eating Disorder Inventory (EDI; Lindeman et al. 2000; Yackobovitch-Gavan et al. 2009; Hansson et al. 2011; Timko et al. 2012; Heiss et al. 2017; Novara et al. 2022), the Eating Pathology Symptoms Inventory (EPSI; McLean, Moeck, et al. 2022), the Mini International Neuropsychiatric Interview (MINI; Hanras, Boujut, et al. 2022), and the Three-Factor Eating Questionnaire (TFEQ; McLean and Barr 2003; Curtis and Comer 2006; Fisak et al. 2006; Forestell et al. 2012; Brytek-Matera et al. 2019; Brytek-Matera 2020a; Brytek-Matera 2020b; Gwioździk et al. 2022; Şentürk et al. 2022)

General population sample

Heterogeneous results have been reported, including a higher prevalence of EDs and higher scores in vegetarians than in non-vegetarians (Lindeman et al. 2000; Perry et al. 2001; Klopp et al. 2003; McLean and Barr 2003; Baş et al. 2005; Robinson-O'Brien et al. 2009; Hansson et al. 2011; Fatima and Ahmad 2018; Paslakis et al. 2020; McLean, Lavale, et al. 2022), a higher prevalence of EDs and higher dietary restraint scores in omnivores than in vegetarians (including the various subcategories of vegetarianism; Curtis and Comer 2006;

Heiss et al. 2017, 2018, 2019; Şentürk et al. 2022), and the absence of differences based on diet (Fisak et al. 2006; Barthels et al. 2018; Çiçekoğlu and Tunçay 2018; Brytek-Matera et al. 2019; Dorard and Mathieu 2021; Gwioździk et al. 2022). Studies have also examined eating symptomatology through the EAT by distinguishing between subcategories of vegetarian diets (strict vegetarianism vs. partial vegetarianism) characterized by very different levels of food selectivity. Semi-vegetarians obtained higher dietary restraint scores than vegetarians, vegans, and omnivores (Curtis and Comer 2006; Timko et al. 2012).

Timko and colleagues (2012) conducted two studies using different tools to measure eating-related attitudes and behaviors. One study sought to determine if there were differences between individuals with different diets (vegetarian, vegan, semi-vegetarian, and omnivore), and the other sought to determine exactly how semi-vegetarians differed from omnivores. Although neither group appeared to be at risk for ED (EAT-26 total score below the threshold of 20), semi-vegetarians reported greater weight fluctuations over the course of a week and devoted more time and thought to food than omnivores. In addition, vegans and omnivores had a greater desire for thinness than vegetarians and semi-vegetarians.

Clinical population sample

Studies have estimated the prevalence of vegetarianism in clinical populations with EDs (Hadigan et al. 2000; Hansson et al. 2011; Bardone-Cone et al. 2012; Zuromski et al. 2015). Their results showed that the prevalence of current and lifetime vegetarianism was higher in individuals with an ED diagnosis than in the control group, especially in anorexic and recovered patients. A recent study also found a higher proportion of binge-eating disorder among vegetarians with obesity compared to omnivores with obesity (Hanras, Boujut et al. 2022). However, the timing of dietary changes and ED are not clear. While Tannhauser and colleagues (2001) reported that nearly half of their patients with anorexia nervosa had transitioned to

vegetarianism several years prior to their ED, other studies reported a higher prevalence of vegetarianism in uncured ED patients than in patients whose ED evolved favorably (Yackobovitch-Gavan et al. 2009; Hansson et al. 2011).

Furthermore, Zuromski and colleagues (2015) showed that the proportion of vegetarianism (current and past) was higher in the clinical group with the highest EDE-Q score: this group included more ovo-lacto-vegetarians, and vegans were represented only in this group. In the study by Bardone-Cone and colleagues (2012), 42.2% of participants who presented or were currently presenting with an ED (without differentiation) reported the desire to control their weight as their primary motive for switching to a vegetarian diet. Conversely, this was not the main motivation cited by vegetarians with no history of EDs. Moreover, 68.1% of the ED patients felt that their vegetarianism was related to their ED, and 59.6% reported that their vegetarianism began at least one year after the onset of their first ED symptom (Bardone-Cone et al. 2012).

3.2.3. Vegetarianism and orthorexia nervosa

Many researchers consider that orthorexia nervosa (ON) should be included among EDs (Donini et al., 2022). ON is defined by the presence of obsessions about food quality (Bratman 1997; Bratman and Knight 2000). These obsessions can have detrimental social (e.g., isolation), occupational (e.g., cognitive impairment), physical (e.g., malnutrition, weight loss), and psychological (e.g., distress) effects (Cena et al. 2019; Donini et al. 2022; Hanras, Dorard, et al. 2022).

Several studies have investigated the association between ON and vegetarian diets using the Bratman Orthorexia Test (BOT; Dittfeld et al. 2017), the ORTHO (Missbach et al. 2015; Dell’Osso et al. 2016; Çiçekoğlu and Tunçay 2018; Heiss et al. 2019; Parra-Fernández et al. 2020; Dell’Osso et al. 2022; Gwioździk et al. 2022), the Eating Habits Questionnaire (EHQ;

Brytek-Matera et al. 2019; Brytek-Matera 2020a; Brytek-Matera 2020b; Novara et al. 2022), the Düsseldorf Orthorexia Scale (DOS; Barthels et al. 2018; Luck-Sikorski et al. 2019; Ferreira and Coimbra 2020 Nov 2; Hessler-Kaufmann et al. 2021), and the Teruel Orthorexia Scale (TOS; Mañano et al. 2022; Şentürk et al. 2022). The latter questionnaire allows distinguishing the healthy side of orthorexia (interest in healthy eating) from its pathological side (EDs ; Barrada and Roncero 2018).

Most studies have shown that vegetarians (including vegans) are more likely to exhibit orthorexic tendencies than omnivores, regardless of the assessment tool (Missbach et al. 2015; Dell’Osso et al. 2016; Dittfeld et al. 2016; Dell’Osso et al. 2018; Brytek-Matera et al. 2019; Heiss et al. 2019; Luck-Sikorski et al. 2019; Brytek-Matera 2020a; Brytek-Matera 2020b; Parra-Fernández et al. 2020; Hessler-Kaufmann et al. 2021; Dell’Osso et al. 2022; Gwioździk et al. 2022; Mañano et al. 2022; Novara et al. 2022; Şentürk et al. 2022 Aug 2). More specifically, ON was reported more frequently in vegetarians, pescovegetarians, vegans, and fruitarians (a fortiori vegans), but also in individuals following a paleo, gluten-free, or raw-food diet (Catalina Zamora et al. 2005; Dittfeld et al. 2017; Strahler et al. 2018; Ferreira and Coimbra 2020). These results are consistent with those reporting a stronger health motivation for food choices among vegetarians (Dorard and Mathieu 2021; Siebertz et al. 2022). The studies that do not associate ON with vegetarianism are those reporting food choices motivated by animal welfare, ecology, and/or politics (Barthels et al. 2018; Çiçekoğlu and Tunçay 2018).

4. Discussion

The findings concerning the association between vegetarianism and weight are homogeneous, pointing for the most part to a lower BMI and weight status among vegetarians than among omnivores. However, the literature is heterogeneous regarding the association between vegetarianism and EDs, especially depending on the nature of the samples and the

dimensions evaluated. Although the designs of the studies have been refined, in particular with regard the selection of participants, their results are still subject to confounding factors, most importantly the poor specification of diets even though the latter have extremely diverse degrees of selectivity. This helps to explain the heterogeneity of certain conclusions, particularly regarding the associations between vegetarian diets and EDs.

4.1. Vegetarianism and Body Mass Index

4.1.1. Observational studies

The research suggests that vegetarianism may be a dietary option to improve diet and weight (Smith et al. 2000; Position of the American Dietetic Association and Dietitians of Canada 2003; Bedford and Barr 2005; Key et al. 2009; Robinson-O'Brien et al. 2009; Wu et al. 2011; Timko et al. 2012; Yang et al. 2012; Salameh et al. 2014; Tong et al. 2018; Wirtzler et al. 2018; Tong et al. 2019; Zickgraf et al. 2020), notably for treating and preventing overweight and obesity. Better adherence to nutritional recommendations (Barr and Broughton 2000) and a propensity to make healthier food choices have been found among vegetarians (Orlich et al., 2013). As a result, vegetarians and vegans report greater consumption of fruits, especially fresh fruits, vegetables, legumes, nuts, and seeds, and lower consumption of fats and sugary drinks than omnivores (Robinson-O'Brien et al. 2009; Radnitz et al. 2015; Heiss et al. 2017; Segovia-Siapco et al. 2019). Moreover, vegans prepare and cook their meals more often than omnivores (Heiss et al. 2017), suggesting that they purchase more unprocessed (i.e., "raw") foods that are known to be more nutritious (Ja and Sn 2015; Mills et al. 2017; Fertig et al. 2019). Meanwhile, fruit, vegetable, legume, and oilseed consumption are more common among vegans than among vegetarians (Beezhold et al. 2015). Thus, switching to a vegetarian or vegan diet is part of a healthy lifestyle that goes beyond nutrition, as many studies have shown that vegetarians and vegans have higher levels of physical activity, smoke less, and engage in less

risky alcohol consumption than non-vegetarians (Bedford and Barr 2005; Key et al. 2009; Farmer et al. 2011).

4.1.2. Interventional studies

The literature does not provide a conclusive answer to the question of the effects of vegetarian diets on weight. Most prospective studies have been conducted in overweight or obese individuals whose goal was weight loss through interventional programs (Burke et al. 2008; Jenkins et al. 2014; Turner-McGrievy et al. 2015; Barnard et al. 2018; Kahleova et al. 2020; Barnard et al. 2021; Garousi et al. 2021). These programs consisted primarily of a prescribed vegan diet with recommendations for calorie and fat restriction and encouragement to consume low-glycemic-index, gluten-free, whole, non-industrial, and/or prepared foods (Karttinen et al. 2000; Burke et al. 2006; Turner-McGrievy et al. 2007; Burke et al. 2008; Elkan et al. 2008; Barnard, Cohen, et al. 2009; Jenkins et al. 2009; Chainani-Wu et al. 2011; Kahleova et al. 2011; Acharya et al. 2013; Jenkins et al. 2014; Turner-McGrievy et al. 2014; Turner-McGrievy et al. 2015; Cohen et al. 2017; Lee et al. 2017; Wright et al. 2017; Barnard et al. 2018; Campbell et al. 2019; Jakše et al. 2019; Garousi et al. 2021). Some programs also prescribed physical activity (Burke et al. 2006; Burke et al. 2008; Chainani-Wu et al. 2011; Kahleova et al. 2011; Acharya et al. 2013; Kent et al. 2013; McDougall et al. 2014; Yadav et al. 2016; Jakše et al. 2017; Lee et al. 2017; Jakše et al. 2019; Chiarioni et al. 2021), provided interventions for stress management (Chainani-Wu et al. 2011; Kent et al. 2013) and/or for limiting alcohol consumption (Barnard, Cohen, et al. 2009; Kahleova et al. 2011; Barnard et al. 2018; Barnard et al. 2021), and/or were carried out in residence (McDougall et al. 2014; Cohen et al. 2017). All of these elements constitute confounding factors that bias the results regarding weight loss and/or change in weight status, thus limiting the scope of the results.

Prospective cohort studies that have compared the effect of a vegan diet with a standard diet (i.e., National Cholesterol Education Program Step, standard weight-loss diet) also have limitations. Standard diets are generally used as control diets to help in the management of weight loss, diabetes, and cholesterol (Turner-McGrievy et al. 2004; Barnard et al. 2005; Turner-McGrievy et al. 2007; Barnard, Gloede, et al. 2009; Kahleova et al. 2011; Acharya et al. 2013; Shah et al. 2018; Garousi et al. 2021). They are therefore an intervention in themselves and do not truly allow for a control group. This likely contributes to the observation of similar weight loss between groups (Phillips et al. 2004; Barnard, Cohen, et al. 2009; Acharya et al. 2013; Shah et al. 2018; Sofi et al. 2018). In addition, intervention programs carried out in centers (health farms or retreats) and with weekly meetings, exercise, and/or cooking classes are not easily implemented outside an extensive study setting. Thus, these interventions are specific to research and are not necessarily typical of individual lifestyles with a plant-based diet (vegetarian, vegan, etc.).

4.2. Relationship between vegetarianism, disordered eating psychopathology, and orthorexia

4.2.1. Disordered eating psychopathology

The current literature reports heterogeneous results regarding the association between vegetarianism and EDs (diagnoses or eating-related dimensions); while some studies highlighted the existence of a positive link (Hadigan et al. 2000; Lindeman et al. 2000; Perry et al. 2001; Klopp et al. 2003; McLean and Barr 2003; Baş et al. 2005; Robinson-O'Brien et al. 2009; Bardone-Cone et al. 2012; Timko et al. 2012; Fatima and Ahmad 2018; Paslakis et al. 2020; Zickgraf et al. 2020), others did not (Fisak et al. 2006; Estima et al. 2012; Heiss et al. 2017; Çiçekoğlu and Tunçay 2018; Dorard and Mathieu 2021). However, when carefully evaluating the results presented so far, differences can be observed depending on the population studied. The association between vegetarianism and EDs has been reported more in patients

diagnosed with an ED and/or fulfilling the relevant DSM criteria than in a control group. This association manifests in several ways: a greater prevalence of vegetarianism in individuals with an ED (Hadigan et al. 2000; Zuromski et al. 2015), the onset of vegetarianism before that of the ED for half of the patients (Tannhauser et al. 2001; Bardone-Cone et al. 2012), and the role of vegetarianism in the remission of patients, where the maintenance of a selective diet contributes to non-remission, whereas the discontinuation of this diet is more frequent among recovered individuals (Yackobovitch-Gavan et al. 2009; Hansson et al. 2011). These studies conducted on clinical populations indicate that the avoidance of certain food categories, such as meat or dairy products perceived as fatty, could be a risk factor for the development of EDs and occurs preferentially in individuals with EDs. In addition, McLean and colleagues (2003) have shown that many vegetarians have a history of EDs, suggesting the development or continuation of a selective diet after an episode of this type. In this context, adopting a meatless diet may not be a cause of EDs but rather serves to mask and maintain existing ED symptomatology when the selective diet appears before or co-occurs with the ED, or it acts as a coping strategy to gain some control over the diet and the body after engaging in disturbed eating behavior. Moreover, the treatment of EDs may lead individuals to discontinue their vegetarian diet.

The results were more heterogeneous in the general population, even when the same measurement tool was used. Contrary to previous findings (Lindeman et al. 2000; Klopp et al. 2003; Baş et al. 2005; Curtis and Comer 2006; Fatima and Ahmad 2018), recent studies have suggested that vegetarians do not exhibit greater levels of EDs than omnivores (Estima et al. 2012; Forestell et al. 2012; Çiçekoğlu and Tunçay 2018; Brytek-Matera et al. 2019; Dorard and Mathieu 2021). In recent research linking vegetarianism and EDs, the average age and age range of individuals were lower. While EDs frequently start in adolescence, so does vegetarianism. This diet could help control the fate of the body, which changes at puberty, and allow the adolescent to assert themselves as an individual different from others and from their parents

(Fox and Ward 2008; Trautmann et al. 2008). In addition, sometimes similar and sometimes different eating attitudes are observed between vegans and omnivores (Heiss et al. 2017; Barthels et al. 2018; Brytek-Matera et al. 2019; McLean, Moeck, et al. 2022). Some research even revealed differences in results with the same assessment tool: in studies that used the EDE-Q, vegans obtained both significantly lower and higher scores than omnivores. The presence of motivational differences could partly explain this discrepancy. Indeed, Zickgraf and colleagues (2020) showed that weight-motivated vegetarians were at greater risk of developing an ED than non-weight-motivated vegetarians and omnivores (these last two groups did not differ from each other). Continuing the research by distinguishing groups of vegetarians based on their motivations may be one avenue for better understanding the presence or absence of problematic eating attitudes.

In the few studies that have compared vegetarian subgroups, only semi-vegetarians and flexitarians appear to be more concerned about their weight and are at greater risk of developing disorderly eating behavior than vegetarians and omnivores (Curtis and Comer 2006; Forestell et al. 2012; Timko et al. 2012). Semi-vegetarianism and flexitarianism may be dietary options to control the body and limit weight gain, perhaps more than to lose weight. Identifying and presenting oneself as being semi-vegetarian or flexitarian, identities that can be socially valued by some (Mathieu and Dorard 2021), may in a way justify the act of dieting (in the popular sense, that is, in order to lose weight or prevent weight gain), especially in Western countries where physical appearance contributes considerably to self-esteem (Valls et al. 2013).

This diet can also be chosen for reasons other than those related to body and weight. Ethical motivations and, more recently, sustainability are also frequently mentioned to justify the decision to move towards a vegetarian diet (Zuromski et al. 2015; Rosenfeld 2018). Individuals who have adopted a more or less strict vegetarian diet for reasons mainly unrelated to weight might, at first glance, be less alarming than individuals who indulge in this type of

diet for health and/or weight control (Baş et al. 2005; Barrack et al. 2019). However, declarative biases must be considered: although research has shown that vegetarians are less motivated by weight control and express less body dissatisfaction than omnivores (Lindeman et al. 2000; Dorard and Mathieu 2021), a qualitative study by Mathieu and Dorard (2021) highlighted the presence of weight and body concerns before entering vegetarianism, even though the majority justified adopting the new diet for ethical reasons. Thus, a lack of association between EDs and vegetarianism does not mean that the chosen selective diet does not fulfill a function related to weight and the body. Some questions therefore remain unanswered: would the transition to a vegetarian diet lead to a reduction in concerns about the body and weight? Would adopting a vegan diet for ethical reasons respond to a desire for thinness or body change? Continued research on vegetarianism in relation to social desirability would be valuable, especially because it may bias self-reported variables given that ethical motivations, being socially accepted and acceptable, may help individuals to present themselves favorably.

4.2.2. Orthorexia nervosa

The current literature reports homogeneous results concerning the association between vegetarian and vegan diets and ON. However, several studies have shown that it is rather the way in which the diet is adhered to that is a risk factor for the development of ON. Indeed, Novara and colleagues (2022) have shown that it is the adherence to any diet that is associated with ON, not only the vegetarian diet in general. Thus, it appears that strict and rigid adherence to dietary practices is more likely to be associated with ON (Bratman 2017) than vegetarian diets more broadly. In addition, the underlying motives for the dietary transition appear to be a risk factor for the development of ON. Vegetarians and vegans motivated by health concerns are at greater risk of developing ON than those motivated by ethical reasons (Brytek-Matera et al. 2019; Barthels et al. 2020). Motivations for food choice differ between types of orthorexia.

Depa and colleagues (2019) showed that healthy orthorexia scores were more associated with the food-choice motive "natural content", whereas pathological orthorexia was associated with "weight control". However, no study to date has examined food-choice motives in relation to vegetarianism and the different sides of orthorexia. To better understand the associations between orthorexia and vegetarian dietary behaviors, it is necessary to further investigate food-choice motives specific to these populations.

4.3. Limitations

The way the diet is measured is an important limitation in studies on nutrition. Some studies asked participants to freely indicate the diet they adopted, while others gave more or less strict definitions depending on whether subgroups of vegetarianism were considered or not. However, the literature has demonstrated the existence of a gap between the diet identities with which an individual identifies and the type of food they actually consume (Ruby 2012; Rosenfeld 2018; Mathieu and Dorard 2021). Moreover, individuals may have difficulty in accurately identifying their diet (Juan et al. 2015; Barthels et al. 2018). In several studies, participants were asked to complete a food diary or the Food Frequency Questionnaire (FFQ; Thompson and Byers 1994) to identify their dietary intakes, sometimes in addition to a self-categorization of diet. The use of the FFQ, or another standardized dietary assessment tool, appears to be necessary to more accurately categorize individuals according to their reported dietary practices (Juan et al. 2015). This assessment should cover at least the past month, and not only the past days as proposed in some studies, in order to take into account the existence of possible deviations from dietary practices. Indeed, some individuals mention a "craving" for meat products, while others express a certain flexibility of consumption according to the context. These dietary deviations cannot be captured by using a food diary over a very short period. Thus, studies with an interest in vegetarianism must adopt a clear and structured methodology to limit bias and obtain

information that is as close as possible to reality. At a minimum, researchers should incorporate a questionnaire such as the FFQ to assess dietary practices, as only asking participants to respond freely regarding their adopted diet appears insufficient in view of the cognitive dissonance existing between identity and diet.

The use of BMI as a measure of body weight is also somewhat problematic, as it does not provide information about variations and changes in body composition (especially in terms of fluids, body fat, muscle mass, and height). BMI is nevertheless the only index validated by the World Health Organization for assessing an individual's build and possible health risks. It therefore remains a useful tool, which is frequently used in weight research. Future research could make greater use of the categorical aspect of BMI and, thus, supplement the averages obtained.

The tools frequently used to assess EDs also have limitations. Some tend to increase the score for certain items or subscales, on the one hand because behaviors related to food can be considered the norm within the framework of a selective diet, and on the other hand because the omnivorous diet appears implicitly as the reference diet. Items questioning the presence of increased attention to what is eaten contribute to inflating the score when this may be an expected attitude for individuals excluding certain types of food. However, check-and-control behaviors can be observed, such as checking the origin of the food, the content of prepared meals, or the presence of additives (Mathieu and Dorard 2021), without necessarily pointing to an ED diagnosis. Further studies are needed on the cognition and behaviors of vegetarians that may be synonymous with disturbed eating attitudes, notably cognitive restriction and orthorexia (based on the continuum from normal to pathological). However, there is a need to use robust assessment tools for the ON. The bulk of these tools (e.g., BOT, ORTHO) measure an interest in healthy eating (i.e., healthy orthorexia) rather than a pathological preoccupation (i.e., ON; (Dunn and Bratman 2016; Cena et al. 2019; Heiss et al. 2019; Meule et al. 2020; Niedzielski

and Kaźmierczak-Wojtaś 2021; Hanras, Dorard, et al. 2022). The healthy and pathological sides of orthorexia can be distinguished with the TOS (Barrada and Roncero 2018), but also with a new version of the EHQ and the DOS (Hallit et al. 2021).

Finally, a total of 133 studies were included in this overview, which is considerable. The method of study selection is not free from bias in generalizing the results. Indeed, the quality of the studies was not assessed using a specific procedure, as in systematic reviews, which may complicate the interpretation and generalization of some of the results (Rethlefsen et al. 2021). For example, studies that combined different vegetarian dietary patterns into one group were included in this review. However, our results and those of others (Timko et al. 2012; Rosenfeld 2018) highlight the importance of distinguishing between different vegetarian dietary patterns, because each is specific, for example, in terms of motivations for food choices, or in terms of their associations with EDs (Forestell et al. 2012; Timko et al. 2012). It is therefore essential that future studies properly differentiate these different dietary practices. Furthermore, the studies were not screened for gender and age of participants. These two variables could have been addressed more specifically, but that was not the purpose of this overview. However, future synthetic articles could assess the extent to which gender and age influence vegetarian diets in an effort to refine our understanding.

4.4. Need for further research

More research is required to clarify the nature of the mechanisms underlying the association between vegetarianism (in the broad sense) and EDs. An emerging question is whether the relationship between vegetarianism and EDs is influenced by conditions that often coexist with eating pathologies, such as anxiety and depression. Although some studies provide insights, several questions currently remain unanswered: does vegetarianism increase vulnerability to the development of EDs in at-risk individuals? Is vegetarianism used to mask

food restriction during the onset of an ED, especially anorexia nervosa? Studies are needed to determine the directionality of the associations previously revealed in the cross-sectional studies. Assessing the role of motivation, gender, and age in the relationship between vegetarianism and EDs in both the general and the clinical population seems a promising avenue for shedding light on these links.

Moreover, the fact that individuals differ in terms of vegetarian diet (more or less strict) and motivations (health, ethics, weight control, etc.) raises questions about the underlying personality traits. In other words, do personality dimensions contribute to the co-occurrence of vegetarianism and disordered eating behaviors? If so, which ones? The few studies that have examined the association between personality traits and vegetarianism have reported somewhat inconsistent results: both positive and negative associations have been found between vegetarian diet and extraversion (Möttus et al. 2012; Kessler et al. 2016), conscientiousness (Möttus et al. 2013; Keller and Siegrist 2015; Kessler et al. 2016; Pfeiler and Egloff 2018; Pfeiler and Egloff 2020), and neuroticism (Forestell and Nezelek 2018; Pfeiler and Egloff 2020). However, the literature more unanimously indicates vegetarianism is more positively related to agreeableness and openness (Kessler et al. 2016; Forestell and Nezelek 2018; Pfeiler and Egloff 2018; Pfeiler and Egloff 2020; Tan et al. 2021). Additional studies considering the different types of vegetarians are needed to complete the existing literature.

Finally, an interesting avenue would be to examine how the chosen diet fits with the way the eating takes place (intuitively or emotionally, in a healthy or unhealthy way with cognitive restraint and/or excessive concerns around food), and the question of well-being (quality of life, presence or absence of psychological distress). These elements should be explored in future research with a sufficiently large sample and using questionnaires that consider the degree of selectivity of the diet.

5. Conclusion

This overview showed that following a vegetarian diet (in the broad sense) may have (beneficial) health effects on body weight and BMI. These findings are however significantly affected by elements such as the presence of confounding factors in prospective cohort studies and the high susceptibility of cross-sectional studies to biases. Nonetheless, the observation of a lower BMI in vegetarians may raise questions regarding eating behavior. Although the literature remains heterogeneous as to the association between vegetarianism and EDs, health professionals must therefore be alert to the emergence of dietary difficulties when their patients adopt a vegetarian diet at large. Finally, while orthorexia nervosa and vegetarianism appear to be linked, it is necessary to break away from the purely pathological aspect of orthorexia and integrate the notion of healthy concern for the foods consumed. Additional research on the quality of life of vegetarians (at large) and how they regulate their emotions is needed to improve knowledge on the psychological health of this group, among which diets, motivations, and beliefs differ. To do so, considering the different subgroups of vegetarians is essential to identify the similarities and differences between them and with omnivorous individuals.

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Table 1. Characteristics of cross-sectional studies assessing vegetarianism and body mass index and/or weight status, 2000–2022.

Reference	Country	Population	Recruitment procedure	Diet assessment	Main findings
Acosta-Navarro et al. (2017)	Brazil	N = 88; 100% males; ≥ 35 years Two groups: - $n = 44$ vegetarians (no meat, poultry, and fish for at least 4 years; age: 45.5 ± 7.8) - $n = 44$ omnivores (age: 46.8 ± 9.6)	In the city through social activities and announcements on the internet	FFQ	Vegetarians had lower BMI than omnivores (23.1 vs. 27.2, $p < .001$)
Baines et al. (2007)	Australia	N = 9,113; 0% males; 22–27 years Three groups: ^a - $n = 252$ vegetarians (no meat, poultry, and fish) - $n = 827$ semi-vegetarians (no red meat) - $n = 8,034$ omnivores (red meat included)	From the national health insurance database	Self-reported food category exclusion	Semi-vegetarians and vegetarians were more likely to be in the normal BMI range than omnivores (respectively, 23.0 and 22.2 vs. 23.7, $p < .001$)
Boutros et al. (2020)	Canada	N = 56; 0% males; 18–35 years Two groups: - $n = 28$ vegans (only plant-based food; age: 27.1 ± 3.7)	Emails and social media, short presentations in university classrooms	Frequency of consumption of different food categories (3-day food diary)	No difference in BMI between the groups

		- <i>n</i> = 28 omnivores (meat at least three times a week; age: 24.2 ± 4.1)			
Brytek-Matera (2020a)	Poland	N = 370 ^b Two groups: - <i>n</i> = 188 vegetarians (no meat; age: 28.9 ± 10.3) - <i>n</i> = 188 vegetarians (no meat; age: 28.9 ± 10.3)	General population via restaurants, posters, and social networks	Self-reported vegetarian diet (Yes/No)	Vegetarians had significantly lower BMI than omnivores (21.7 vs. 23.1, <i>p</i> < .001)
Burkert et al. (2014)	Austria	N = 15,474; 45.3% males; ≥ 15 years Four groups: ^a - <i>n</i> = 343 vegetarians - <i>n</i> = 3,648 carnivorous diet rich in fruits and vegetables - <i>n</i> = 7,503 carnivorous diet less rich in meat - <i>n</i> = 3,980 carnivorous diet rich in meat	Austrian Health Interview Survey 2006/07	Interview on vegetarian or vegan diets with explicit definitions For carnivores, the frequency of meat consumption was assessed to categorize participants into “carnivorous diet less rich in meat” or “carnivorous diet rich in meat”	The more plants the diet contains, the lower the BMI: vegetarians had the lowest BMI (22.9), followed by those with a carnivorous diet rich in fruits and vegetables (24.9), then those with a carnivorous diet less rich in meat (25.2), and those with a carnivorous diet rich in meat had the highest BMI (25.9; <i>p</i> < .001)
Cade et al. (2004)	UK	N = 35,372; 0% males; 35-69 years Four groups: ^a - <i>n</i> = 6,478 vegetarians (age: 49 ± NR)	Through the World Cancer Research Fund’s	Self-reported with a question about the adherence to a vegetarian diet FFQ to verify the self-reported diet	Meat eaters had higher BMI than oily-fish eaters (25.0 vs. 23.2), other fish eaters (23.3), and vegetarians (23.3) (No indicator of significance reported)

		<ul style="list-style-type: none"> - $n = 870$ oily-fish eaters (age: $51 \pm \text{NR}$) - $n = 3,286$ other fish eaters (age: $50 \pm \text{NR}$) - $n = 24,738$ meat eaters (age: $54 \pm \text{NR}$) 			
Chang et al. (2019)	Taiwan	<p>$N = 4,839$; 40.7% males; 20–87 years</p> <p>Two groups:</p> <ul style="list-style-type: none"> - $n = 1,403$ vegetarians (age: 54.0 ± 9.3) - $n = 3,436$ non-vegetarians (age: 51.8 ± 10.5) 	Individuals with or without gallstone disease recruited at the Buddhist Dalin Tzu Chi Hospital	Self-reported with a question about the adherence to a vegetarian diet	The prevalence of overweight and obesity was higher in non-vegetarians than in vegetarians (46.9% vs. 33.6%, $p < .001$)
Chang-Claude et al. (2005)	Germany	<p>$N = 1,904$; 45.1% males; 34–75 years</p> <p>Two groups:^a</p> <ul style="list-style-type: none"> - $n = 1,225$ vegetarians (including lacto-vegetarians, ovo-vegetarians, and vegans) - $n = 679$ health-conscious non-vegetarians 	Recruited from readers of relevant vegetarian magazines	FFQ	Vegetarians had lower BMI than non-vegetarians (20.7 vs. 21.3) (No indicator of significance reported)
Chen et al. (2019)	Taiwan	<p>$N = 985$; 19% males; ≥ 60 years</p> <p>Two groups:</p> <ul style="list-style-type: none"> - $n = 512$ vegetarians (age: 70.0 ± 6.9) 	Volunteers participating in recycling work in community environmental stations	NR	Vegetarians had lower BMI than omnivores (23.9 vs. 24.9, $p < .001$)

		- $n = 473$ omnivores (age: 71.3 ± 6.6)			
Cui et al. (2019)	China	N = 558; 17.6% males; 27–41 years Two groups: - $n = 279$ vegetarians (two subgroups: 73 vegans and 206 lacto-ovo-vegetarians; age: $33.2 \pm \text{NR}$) - $n = 279$ omnivores (age: $32.0 \pm \text{NR}$)	Vegetarian restaurants, social organization activities, social media, and the internet	Interview on vegan or lacto-ovo-vegetarian diet and diet duration	Vegetarians had lower BMI than omnivores (20.5 vs. 21.9, $p < .05$), and had a lower proportion of overweight (9.0% vs. 20.4%) and obesity than omnivores (1.8% vs. 5.0%)
Dorard and Mathieu (2021)	France	N = 101; 25.7% males; 18–70 years Two groups: - $n = 49$ vegetarians (age: 28.6 ± 11.6) - $n = 52$ omnivores (age: 30.3 ± 12.4)	General population via social media	Self-reported with a question about adherence to a vegetarian diet with explicit definitions ranging from flexitarian to vegan diet	Vegetarians had lower current (22.0 vs. 23.8), ideal (20.7 vs. 22.0), and lifetime (19.2 vs. 20.7) BMI than omnivores ($p < .05$)
Farmer et al. (2011)	USA	N = 13,292; 50.8% males; ≥ 19 years Two groups: ^a - $n = 851$ vegetarians (no meat, poultry, or fish) - $n = 12,441$ non-vegetarians (meat, poultry, or fish)	National Health and Nutrition Examination Survey	Frequency of meat, poultry, or fish consumption	All vegetarians had lower BMI than non-vegetarians (26.8 vs. 28.1, $p < .01$), dieters (29.8 vs. 31.4) or not (25.2 vs. 26.7)

Fontana et al. (2005)	USA	<p>N = 36; 61.1% males; 33–85 years, mean: 54.2 ± 11.5</p> <p>Two groups:^a</p> <ul style="list-style-type: none"> - n = 18 raw-food vegetarians - n = 18 omnivores with a typical American diet 	Advertisements at the St Louis Vegetarian Society and in raw-food online magazines	NR	Raw-food vegetarians had significantly lower BMI than omnivores, regardless of gender (for males: 20.7 vs. 25.5, $p < .001$; for females: 20.1 vs. 25.4, $p < .01$)
Fontana et al. (2007)	USA	<p>N = 63; 61.9% males</p> <p>Three groups:</p> <ul style="list-style-type: none"> - n = 21 sedentary vegans (low-calorie low-protein diet with no meat, dairy, eggs, cooked and processed foods; age: 53.1 ± 11.0) - n = 21 omnivorous endurance runners (age: 53.2 ± 10) - n = 21 sedentary omnivores (age: 53.1 ± 9.0) 	Advertisements at the St Louis Vegetarian Society and in raw-food online magazines	Interview of consumption of different food categories (7-day food diary)	BMI was lower in sedentary vegans than in sedentary omnivores (21.3 vs. 26.5, $p < .001$)
Forestell et al. (2012)	USA	<p>N = 240; 0% males</p> <p>Five groups:</p> <ul style="list-style-type: none"> - n = 55 vegetarians (age: 19.4 ± 1.5) - n = 28 pesto-vegetarians (age: 19.8 ± 4.1) - n = 29 semi-vegetarians (age: 19.6 ± 5.9) - n = 37 flexitarians (age: 18.5 ± 1.6) 	College students recruited from introductory psychology classes	GEH (choose one of the seven diet categories with explicit definitions)	No difference in BMI between selective diet groups and omnivores

		- $n = 91$ omnivores (age: 19.1 ± 3.6)			
Gammon et al. (2012)	New Zealand	N = 124; 0% males Two groups: - $n = 34$ vegetarians (age: 36.6 ± 10.1) - $n = 90$ non-vegetarians (red meat, fish, or chicken; age: 40.3 ± 9.1)	Recruited in Auckland city	Self-reported (without any other details)	Vegetarians had lower BMI than non-vegetarians (23.9 vs. 25.9 , $p < .05$) No difference in the prevalence of overweight/obesity between the 2 groups
Grant et al. (2021)	Australia	N = 688; 12.1% males; 14–17 years, mean age from 15.1 to 15.6 according to diet status and gender Two groups: ^a - $n = 49$ vegetarians (no meat, poultry, or fish) - $n = 639$ non-vegetarians (any amount of meat, poultry, or fish)	From public and private secondary schools	Frequency of consumption of different food categories	No difference in BMI between groups <i>Note: The researchers applied adult criteria for an abnormal BMI ($BMI > 24.9$) rather than above the 85th percentile, which is used for adolescents. Some participants were probably misclassified.</i>

Hagmann et al. (2019)	Switzerl and	<p>N = 4,213; 52.6% males</p> <p>Four groups:</p> <ul style="list-style-type: none"> - <i>n</i> = 134 vegetarians/vegans (age: 49.2 ± 17.9) - <i>n</i> = 91 pesco-vegetarian (age: 55.8 ± 16.3) - <i>n</i> = 177 low meat eaters (age: 56.3 ± 16.0) - <i>n</i> = 995 regular meat eaters (age: 55.3 ± 16.9) 	Survey sent to residents in the German- and French-speaking regions of Switzerland	Self-reported with a question about adherence to a vegetarian diet with explicit definitions	<p>In the female group, vegetarians had lower BMI than pesco-vegetarians (21.7 vs. 22.1), which was lower than that of low meat eaters (23.4), which was lower than that of regular meat eaters (24.2) (<i>p</i> < .001). The rate of obesity and overweight was higher among regular (10.9% obese and 20.9% overweight) and low meat eaters (6.9% obese and 17.8% overweight) (<i>p</i> < .001)</p> <p>In the male group, the rate of overweight was higher among regular (44.0%) and low meat eaters (36.6%) than in the other groups (<i>p</i> < .001), and the rate of obesity was the highest in the pesco-vegetarian group (22.9%, <i>p</i> < .001)</p>
Heiss et al. (2017)	USA	<p>N = 577; 19.6% males; ≥ 18 years</p> <p>Two groups:</p> <ul style="list-style-type: none"> - <i>n</i> = 357 vegans (age: 31.31 ± 12.41) - <i>n</i> = 220 omnivores (age: 29.41 ± 12.86) 	Social media webpages	Self-reported with a question about adherence to a vegetarian diet with explicit definitions	No difference in BMI between groups, but gender was a covariate

Hessler-Kaufmann et al. (2021)	Germany	<p>N = 511; 36.6% males; 18–84 years</p> <p>Three groups:</p> <ul style="list-style-type: none"> - <i>n</i> = 49 vegetarians (age: 33.8 ± 13.0) - <i>n</i> = 98 semi-vegetarians (age: 41.1 ± 18.1) - <i>n</i> = 364 omnivores (age: 45.3 ± 18.2) 	Recruited from two studies at the Institute for Nutritional Medicine	NR	Vegetarians and semi-vegetarians had lower BMI than omnivores (respectively, 23.8 and 23.3 vs. 25.9, <i>p</i> < .05) but did not differ from each other
Hoffmann et al. (2001)	Germany	<p>N = 243; 0% males; 25–65 years</p> <p>Three groups:^a</p> <ul style="list-style-type: none"> - <i>n</i> = 111 ovo-lacto-vegetarians - <i>n</i> = 132 low-meat eaters - <i>n</i> = 175 with a German mixed diet (meat and unheated vegetables) 	Through an advertisement campaign	Frequency of consumption of different food categories	<p>The rate of underweight was higher for ovo-lacto-vegetarians (17%) and low meat eaters (11%) than omnivores (4%) (<i>p</i> < .05)</p> <p>The rate of overweight (39% vs. 18%) and obesity (9% vs. 1–2%) was higher among omnivores than in the two other groups</p>
Jaacks et al. (2016)	South Asia	<p>N = 17,824; 47.2% males; 20–69 years</p> <p>Two groups:^a</p> <ul style="list-style-type: none"> - <i>n</i> = 5,027 vegetarians (4,968 from South Asia and 59 from the US) - <i>n</i> = non-vegetarians (no restriction on animal-based products) 	South Asia data from the CARRS survey, US data from the NHANES	Food propensity questionnaire (CARRS and NHANES)	<p>Vegetarians had lower BMI than non-vegetarians (25.2 vs. 25.6 in the South Asian sample, and 26.2 vs. 28.9 in the US sample, <i>p</i> < .05)</p> <p>The prevalence of overweight/obesity was lower in vegetarians than in non-vegetarians, in both Asian and US groups (<i>p</i> < .05)</p>

Jakše et al. (2021)	Slovenia	<p>N = 80; 33% males in the vegan group and 45% males in the non-vegan group; ≥ 18 years</p> <p>Two groups: - $n = 51$ vegans (age: 46 ± 9) - $n = 29$ non-vegans (omnivores and lacto-, ovo-, and pesco-vegetarians; age: 57 ± 10)</p>	Through health/fitness coaches or sports and recreational groups	Self-reported with a question about adherence to a vegetarian diet with explicit definitions ranging from vegetarian to vegan diet FFQ to verify the self-reported diet	Vegans had lower current BMI (22.8 vs. 26.6, $p < .001$) and lower maximal lifetime BMI (26.6 vs. 30.3, $p < .001$) than non-vegans
Jin et al. (2018)	USA	<p>N = 892; 52.9% males</p> <p>Two groups: - $n = 335$ vegetarians (no meat, poultry, or fish; age: 55.6 ± 9.2) - $n = 557$ non-vegetarians (meat, poultry, or fish; age: 55.2 ± 9.5)</p>	<p>Baseline data from the MASALA</p> <p>South Asian in San Francisco using surname-based recruitment methods</p>	FFQ	Vegetarians had lower BMI than non-vegetarians (25.6 vs. 26.2, $p < .05$)
Kim and Bae (2015)	Korea	<p>N = 102; 0% males; 47–85 years</p> <p>Two groups: - $n = 54$ vegetarians (semi-vegetarian diet for over 20 years precisely; age: 62.6 ± 9.0) - $n = 48$ non-vegetarians (no details about the diet; age: 60.2 ± 5.7)</p>	Through official advertisements	24-h recall method for 3 non-consecutive days by well-trained interviewers	Vegetarians had lower BMI than non-vegetarians (22.6 vs. 25.2, $p < .001$)

Klopp et al. (2003)	USA	N = 143; 0% males Two groups: - <i>n</i> = 30 vegetarians (age: 19.0 ± 1.0) - <i>n</i> = 113 omnivores (age: 19.0 ± 1.0)	Students recruited on nutrition, psychology, and political science	Self-reported with a question about adherence to a vegetarian diet with explicit definitions ranging from semi-vegetarian to vegan diet	No difference in BMI between groups
Larsson et al. (2002)	Sweden	N = 2,005; 51.7% males; 15–16 years Two groups: - <i>n</i> = 149 low meat consumers (age: 15.6 ± 0.3) - <i>n</i> = 856 omnivores (age: 15.6 ± 0.3)	Students recruited in senior secondary schools	Frequency of consumption of different food categories (12-month food diary)	No difference in BMI between groups, regardless of gender
Nakamoto et al. (2008)	Japan	N = 125; 41.6% males; 30–49 years Two groups: ^a - <i>n</i> = 75 vegetarians (lacto-, ovo-, and semi-vegetarians) - <i>n</i> = 50 non-vegetarians (eating food of both plant and animal origin)	Recruited at a hospital for the vegetarian group and through advertising inside the hospital and companies for the non-vegetarian group	NR	Vegetarian males had lower BMI than non-vegetarian males (21.4 vs. 23.2, <i>p</i> < .05) No difference in BMI between vegetarian and non-vegetarian females
Newby et al. (2005)	Sweden	N = 55,459; 0% males Four groups: - <i>n</i> = 83 vegans (age: 54.8 ± 9.5)	From a population-based mammography screening program	FFQ	Omnivores had higher BMI than semi-vegetarians (24.7 vs. 23.6), lacto-vegetarians (23.4), and vegans (23.3) (<i>p</i> < .005)

		<ul style="list-style-type: none"> - $n = 159$ lacto-vegetarians (age: 51.1 ± 9.5) - $n = 960$ semi-vegetarians (age: 53.6 ± 9.8) - $n = 54,257$ omnivores (age: 52.5 ± 9.7) 			The rate of overweight or obesity was 40% among omnivores, 29% among both semi-vegetarians and vegans, and 25% among lacto-vegetarians ($p < .001$)
Norwood et al. (2019)	Australia	<p>$N = 393$; 17% males; 17–84 years</p> <p>Six groups:</p> <ul style="list-style-type: none"> - $n = 48$ vegetarians (age: $27.38 \pm NR$) - $n = 128$ vegans (age: $32.51 \pm NR$) - $n = 42$ gluten-free diet (age: $41.56 \pm NR$) - $n = 38$ paleo diet (age: $33.91 \pm NR$) - $n = 36$ weight-loss diet (age: $21.81 \pm NR$) - $n = 101$ on unrestricted diet (control group; age: $24.11 \pm NR$) 	Adult community members and students from a large Australian university	Self-reported vegetarian, vegan, gluten-free, paleo, weight-loss, or unrestricted dietary pattern	<p>Vegans (23.5) and vegetarians (23.7) had lower BMI than paleo (26.7), gluten-free (25.4), and weight-loss groups (24.5) and higher BMI than the unrestricted diet group (21.7) ($p < .001$)</p> <p>The obesity rate was intermediate among vegetarians and vegans (10%) compared to the unrestricted group (3%) and the gluten-free and paleo groups (respectively 22% and 19%) ($p < .001$)</p>
Ou et al. (2016)	Taiwan	<p>$N = 63$; 19% males; ≥ 18 years</p> <p>Two groups:</p> <ul style="list-style-type: none"> - $n = 20$ vegetarians (no meat or fish, but small amounts of milk and egg; age: 56.24 ± 13.71) 	Dialysis patients recruited in the dialysis unit of Kaohsiung Veterans General Hospital	NR	Vegetarians had lower BMI than non-vegetarians (20.4 vs. 22.5, $p < .05$)

		- $n = 42$ non-vegetarians (no details about the diet; age: 56.29 ± 11.67)			
Papier et al. (2019)	UK	N = 45,314; 23.7% males; ≥ 20 years Four groups: - $n = 15,426$ vegetarians (age: 39.3 ± 13.0) - $n = 7,092$ fish eaters (age: 41.8 ± 12.7) - $n = 7,615$ low meat eaters (age: 47.3 ± 13.5) - $n = 15,181$ regular meat eaters (age: 49.5 ± 12.9)	Through general practitioners or postal questionnaires	FFQ	BMI was lower in non-meat eaters (22.8 in vegetarians, 22.9 in fish eaters), and in low meat eaters (23.4) than in regular meat eaters (24.6, $p < .001$)
Parra-Fernandez et al. (2020)	Spain	N = 466; 24% males; 18–73 years Three groups: - $n = 101$ vegans (age: 33.3 ± 11.1) - $n = 119$ vegetarians (age: 29.2 ± 11.1) - $n = 256$ omnivores (age: 33.0 ± 11.7)	Spain residents through social networks and local associations	Self-reported (without any other details)	Omnivores (25.8%) were more likely to be overweight than vegetarians (16.7%) and vegans (12.2%, $p < .05$)
Paslakis et al. (2020)	Germany	N = 2,449; 46.5% males; 14–91 years, mean: 49.6 ± 17.1	German residents	Self-reported vegetarian and vegan diet (Yes/No)	Vegetarians had lower BMI than omnivores (24.0 vs. 26.1, $p < .001$)

		Two groups: ^a - <i>n</i> = 133 vegetarians (including vegans) - <i>n</i> = 2,316 omnivores			The obesity rate was lower in vegetarians than in omnivores (8.3% vs. 15.3%, <i>p</i> < .05)
Perry et al. (2001)	USA	N = 4,746; 50.2% male; 11–18 years; mean: 14.9 Set 1: Two groups: ^a - <i>n</i> = 262 vegetarians - <i>n</i> = 4,258 omnivores Set 2: Two groups: ^a - <i>n</i> = 94 restricted vegetarians - <i>n</i> = 158 semi-vegetarians	Students recruited in middle and high schools	Self-reported vegetarian diet (Yes/No) If “Yes”, an additional question was posed regarding subcategories of the vegetarian diet according to food consumed	No difference in BMI between vegetarians and omnivores Semi-vegetarians were less likely to be at risk for overweight than restricted vegetarians (9.2% vs. 21.8%, <i>p</i> < .05)
Rizzo et al. (2013)	USA	N = 71,752; 34.6% males; ≥ 30 years, mean: 59.0 Five groups: ^a - <i>n</i> = 5,694 strict vegetarians - <i>n</i> = 21,799 lacto-ovo-vegetarians - <i>n</i> = 6,583 pesco-vegetarians - <i>n</i> = 4,042 semi-vegetarians - <i>n</i> = 33,634 non-vegetarians (red meat, poultry at least once per month, and other meats and fish more than once per week)	From the Adventist Health Study 2 cohort	FFQ	Strict vegetarians had the lowest BMI (24.0) and obesity rate (9.4%), whereas non-vegetarians had the highest BMI (28.7) and obesity rate (33.3%) (<i>p</i> < .001)

Robinson-O'Brien et al. (2009)	USA	<p>N = 2,488; 44.7% males; 15–23 years</p> <p>Three groups:^a</p> <ul style="list-style-type: none"> - n = 108 current vegetarians - n = 268 former vegetarians - n = 2,112 never vegetarians 	Students and higher education students recruited via Project EAT-I	<p>Self-reported vegetarian diet (Yes/No)</p> <p>If “Yes”, question on current or former vegetarian diet</p>	<p>Among the younger cohort, no difference in BMI and obesity and overweight rates between the groups</p> <p>Among the older cohort, current vegetarians had lower BMI (23.3 vs. 25.0, $p < .05$) and were less likely to be overweight (16.8%) or obese (5.8%) than those who had never been vegetarians (respectively, 20.1% and 10.7%, $p < .05$)</p>
Salameh et al. (2014)	Lebanon	<p>N = 3,307; 40.3% males; 17–37 years</p> <p>Three groups:</p> <ul style="list-style-type: none"> - n = 788 in the vegetarian/low-calorie group (plant foods; age: 20.51 ± 1.95) - n = 1,112 in the Westernized group (Western foods; age: 20.33 ± 1.78) - n = 1,042 in the mixed group (both plant and Western foods; age: 20.31 ± 1.78) 	Students recruited in public and private Lebanese universities	FFQ	No difference in BMI between groups in terms of mean and weight status

Şentürk et al. (2022)	Turkey	<p>N = 1,165; 17.0% males; ≥ 18 years</p> <p>Three groups:</p> <ul style="list-style-type: none"> - $n = 415$ vegans (age: 31.09 ± 10.29) - $n = 324$ vegetarians (age: 31.79 ± 9.47) - $n = 426$ omnivores (age: 31.76 ± 10.45) 	Participants recruited from social media advertisement	Self-reported vegetarian and vegan diet (Yes/No)	Vegetarians and vegans had lower BMI than omnivores ($p < .001$).
Smith et al. (2000)	USA	<p>N = 428; 30% males</p> <p>Four groups:</p> <ul style="list-style-type: none"> - $n = 59$ vegetarians not on a weight-loss diet (age: 20.7 ± 4.0) - $n = 117$ weight-loss non-vegetarian diet (age: 21.4 ± 4.3) - $n = 133$ weight-loss vegetarian diet (age: 21.3 ± 4.3) - $n = 119$ neither group (i.e., who had tried neither diet; age: 20.4 ± 3.4) 	Young adults recruited from psychology, physical education, and nursing courses at university	<p>Self-reported with a question about adherence to a vegetarian diet with explicit definitions ranging from flexitarian to vegan diet</p> <p>If participants indicated that they followed a vegetarian diet (in general), they were then asked to indicate how strictly they followed their diet (1: not strictly at all; 5: extremely strictly)</p>	Vegetarians had lower BMI than the weight-loss group (21.0 vs. 24.1, $p < .01$) and weight-loss vegetarians (23.5, $p < .01$)
Timko et al. (2012)	USA	<p>N = 486; 23% males; ≥ 18 years</p> <p>Four groups:</p> <ul style="list-style-type: none"> - $n = 35$ vegans (age: 26.94 ± 7.93) 	Students recruited at psychology universities, on the internet, and in health food stores	Self-reported with a question about the adherence to a vegetarian diet FFQ to verify the self-reported diet	Vegans had lower BMI than omnivores (21.3 vs. 24.5, $p < .01$)

		<ul style="list-style-type: none"> - $n = 111$ vegetarians (age: 26.73 ± 9.08) - $n = 75$ semi-vegetarians (age: 26.65 ± 9.55) - $n = 265$ omnivores (age: 23.44 ± 9.70) 			
		<p>$N = 117$; 0% males; age: 19.4 ± 2.6</p> <p>Two groups:^a</p> <ul style="list-style-type: none"> - $n = 44$ semi-vegetarians - $n = 74$ unrestricted meat eaters 	Students recruited from psychology department pools of urban universities, via flyers in local health-food stores, on the internet	Self-reported with a question about the adherence to a vegetarian diet FFQ to verify the self-reported diet	No difference in BMI between groups
Tong et al. (2020)	UK	<p>$N = 54,898$ participants; 22.8% males; 20–90 years</p> <p>Four groups:</p> <ul style="list-style-type: none"> - $n = 1,982$ vegans (age: 38.9 ± 13.6) - $n = 15,499$ vegetarians (age: 40.0 ± 13.5) - $n = 29,380$ meat eaters (age: 50.1 ± 13.1) - $n = 8,037$ fish eaters (age: 42.7 ± 13.3) 	EPIC-Oxford cohort with recruitment via general practices or postal questionnaire	Consumption of different food categories (animal products, Yes/No)	<p>The more selective the diet, the lower the BMI (No indicator of significance reported)</p> <p>The prevalence of overweight was highest among meat-eaters (36.6%)</p>

Tong et al. (2019)	UK	<p>N = 48,188 participants with no history of ischemic heart disease, stroke, angina, or cardiovascular disease; 23.4% males; ≥ 20 years</p> <p>Three groups:</p> <ul style="list-style-type: none"> - $n = 16,254$ vegetarians (age: 39.4 ± 13.1) - $n = 24,428$ meat eaters (age: 49 ± 13.1) - $n = 7,506$ fish eaters (age: 42.1 ± 12.8) 	EPIC-Oxford cohort with recruitment via general practices or postal questionnaire	Consumption of different food categories (animal products, Yes/No)	Non-meat eaters reported having lower BMI than meat eaters (23.0 vs. 24.1, $p < .001$) (baseline characteristics)
Tong et al. (2018)	UK	<p>N = 418,749; 45.1% males; 40–69 years</p> <p>Women six groups:</p> <ul style="list-style-type: none"> - $n = 223$ vegans (age: 54.4 ± 8.0) - $n = 4,305$ vegetarians (age: 52.8 ± 7.8) - $n = 6,988$ fish eaters (age: 54.0 ± 8.0) - $n = 3,429$ poultry eaters (age: 56.5 ± 8.0) - $n = 128,429$ low meat eaters (age: 56.5 ± 7.9) - $n = 86,432$ regular meat eaters (age: 56.6 ± 8.0) <p>Men six groups:</p>	UK Biobank	Consumption of different food categories (animal products, Yes/No)	All groups presented significantly lower body weight and BMI than regular meat eaters

		<ul style="list-style-type: none"> - $n = 155$ vegans (age: 53.8 ± 7.7) - $n = 2,061$ vegetarians (age: 52.6 ± 7.9) - $n = 2,686$ fish eaters (age: 54.3 ± 8.0) - $n = 952$ poultry eaters (age: 56.7 ± 8.3) - $n = 71,355$ low meat eaters (age: 57.0 ± 8.1) - $n = 111,734$ regular meat eaters (age: 56.7 ± 8.2) 			
Wirnitzer et al. (2018)	Switzerland and	<p>N = 245; 31.8% males</p> <p>Three groups:</p> <ul style="list-style-type: none"> - $n = 91$ vegans ($37.0 \pm \text{NR}$) - $n = 45$ vegetarians ($39.0 \pm \text{NR}$) - $n = 109$ omnivores ($43.0 \pm \text{NR}$) 	Recreational runners recruited via social media, websites of the organizers of marathon events, online running communities, email lists, and runners' and health, vegetarian and/or vegan nutrition magazines	Consumption of different food categories (animal products, Yes/No)	Vegetarians and vegans had lower body weight than omnivores (respectively, 62 and 64 kg vs. 68 kg, $p = .001$) but no difference in BMI status
Wu et al. (2011)	Taiwan	<p>N = 318; 46.9% males</p> <p>Two groups:</p> <ul style="list-style-type: none"> - $n = 19$ vegetarians (strict vegetarians and lacto-ovo-vegetarians; age: 32.6 ± 12.7) - $n = 299$ non-vegetarians (no details about the diet; age: 34.2 ± 6.0) 	Patients on chronic hemodialysis recruited in dialysis centers	Frequency of consumption of different food categories (3-day food diary)	<p>No difference in BMI between vegetarian subgroups</p> <p>Vegetarians had lower BMI than non-vegetarians (20.2 vs. 22.7, $p < .05$)</p>

Yang et al. (2012)	China	N = 295; 100% males; 21–76 years Two groups: - <i>n</i> = 169 lacto-vegetarians (no meat, egg, fish, and poultry for at least 5 years: age 32.6 ± 12.7) - <i>n</i> = 126 omnivores (age: 34.2 ± 6.0)	Through the social activities of awareness sessions regarding the benefits of healthy lifestyles held in the communities	Food diary (without any other details)	Lacto-vegetarians had lower BMI than omnivores (23.6 vs. 24.4, <i>p</i> < .05)
Zickgraf et al. (2020)	USA	N = 9,910; 44.4% males; ≥ 18 years, mean: 23.4 ± 5.8 Three groups: ^a - <i>n</i> = 413 vegetarians/vegans motivated by weight control - <i>n</i> = 555 vegetarians/vegans not motivated by weight control - <i>n</i> = 8,926 non-vegetarians/vegans (no details about the diet)	Students recruited at colleges and universities across the US	Self-reported vegetarian diets (“Do the following eating practices apply to you?”; e.g., “I am a vegetarian”)	Vegetarians had lower BMI than non-vegetarians (<i>p</i> < .001), with no difference in whether they were weight-motivated or not (23.1 and 22.5)

CARRS: Centre for Cardiometabolic Risk Reduction in South-Asia; FFQ: Food Frequency Questionnaire; GEH: General Eating Habits; MASALA: Mediators of Atherosclerosis in South Asians Living in America; NHANES: National Health and Nutrition Examination Survey; Project EAT: Project Eating Among Teens.

NB: ^a: the mean age of the groups was not mentioned; ^b: no details on the gender of the participants.

All the information listed in the studies is presented. Any missing information was not provided in the studies.

Table 2. Characteristics of prospective cohort studies investigating vegetarianism and weight, 2000–2022.

Reference	Country	Population	Duration	Main findings	Cofounding variables
Acharya et al. (2013)	USA	N = 143 overweight and obese adults; 12% males; 18–55 years Two groups: - <i>n</i> = 64 lacto-ovo-vegetarian diet (age: 45.2 ± 8.1) - <i>n</i> = 79 standard weight-loss diet (age: 43.5 ± 8.8)	6 months	Weight loss (8.5 kg for the standard weight-loss group and 9 kg for the lacto-ovo-vegetarian group) with no significant differences between groups	Calorie- and fat-restricted diets based on gender and baseline body weight Physical activity with a weekly goal of 150 minutes
Barnard et al. (2021)	USA	N = 62 overweight adults; 22.6% males Two groups: - <i>n</i> = 32 Mediterranean diet (age: 56.6 ± 10.9) - <i>n</i> = 30 vegan diet (age: 58.3 ± 8.4)	16 weeks	Significantly higher weight loss in the vegan group than in the Mediterranean diet group (6.0 kg vs. 0.0 kg, <i>p</i> < .001)	Limited alcohol (1/day for women and 2/day for men)
Barnard et al. (2018)	USA	N = 45 adults with type 2 diabetes; 46.7% males; 30–79 years Two groups: - <i>n</i> = 21 low-fat vegan diet (age: 61 ± NR) - <i>n</i> = 24 portion-controlled eating plan (age: 61 ± NR)	20 weeks	Significant weight loss (6.3 kg for the vegan group and 4.4 kg for the portion-controlled group) with no significant differences between groups	Low-fat vegan diet with low-glycemic index foods Limited energy intake for the portion-controlled group (500 kcal deficit/day) Limited alcohol (1/day for women and 2/day for men)

Barnard et al. (2009)	USA	<p>N = 99 adults with type 2 diabetes; 39.4% males, 27–82 years</p> <p>Two groups: - <i>n</i> = 49 low-fat vegan diet (age: 56.7 ± 9.8) - <i>n</i> = 50 conventional diabetes diet (age: 56.7 ± 9.8)</p>	74 weeks	Significant weight loss (4.4 kg for the vegan group and 3.0 kg for the conventional diet group) with no significant differences between groups	<p>Low-fat vegan diet with low-glycemic index foods</p> <p>Limited alcohol (1/day for women and 2/day for men)</p> <p>Participants were free to modify their exercise habits after the first 22 weeks</p>
Barnard et al. (2005)	USA	<p>N = 59 overweight postmenopausal adults; 0% males; 44–73 years</p> <p>Two groups: - <i>n</i> = 29 low-fat vegan diet (age: 57.4 ± NR) - <i>n</i> = 40 national cholesterol education program (control group; age: 55.6 ± NR)</p>	14 weeks	Significantly higher weight loss in the vegan group than in the national cholesterol education program group (5.8 kg vs. 2.8 kg, <i>p</i> < .05)	Low-fat vegan diet
Burke et al. (2008)	USA	<p>N = 176 overweight and obese adults; 13.1% males; 18–55 years</p> <p>Two groups: - <i>n</i> = 96 standard diet</p> <p>Two subgroups of preference for this this: yes (<i>n</i> = 48; age: 43.2 ± 9.4) no (<i>n</i> = 48; age: 43.2 ± 8.4)</p> <p>- <i>n</i> = 80 lacto-ovo-vegetarian diet</p> <p>Two subgroups of preference for this this: yes (<i>n</i> = 35; age: 44.3 ± 8.4)</p>	18 months	<p>Higher weight loss in the groups that were assigned a diet (8.0 kg in the standard diet group and 7.9 kg in the vegetarian diet group) than in those that chose their diet (3.9 kg in the standard diet group and 5.3 kg in the vegetarian diet group; <i>p</i> < .05)</p> <p>No difference in weight loss between the two types of assigned diets</p>	Calorie- and fat-restricted assigned diets, standard behavioral therapy for weight loss, with instruction and counseling in changing behaviors, modifying dietary intake to decrease the number of calories and amount of fat eaten, and increasing physical activity

		no ($n = 45$; age: 43.2 ± 8.6)			
Burke et al. (2006)	USA	<p>N = 182 overweight and obese adults; 12.6% males; 18–55 years</p> <p>Two groups:</p> <ul style="list-style-type: none"> - $n = 84$ standard behavior treatment with lacto-ovo-vegetarian diet (age: 45.0 ± 8.2) - $n = 98$ standard behavior treatment without any diet (age: 43.4 ± 8.9) 	18 months	Significant weight loss (7.5 kg for the standard behavior treatment with lacto-ovo-vegetarian diet group and 6.8 for the standard behavior treatment without any diet group) with no significant differences between groups	<p>Calorie- and fat-restricted diets and physical activity (walking at least 150 min/week)</p> <p>Standard behavior treatment with or without associated diet</p>
Campbell et al. (2019)	USA	<p>N = 79 participants from community groups with overlapping interests (local vegan society and Ornish heart disease support group); 33% males; 25–79 years, mean: 59.2 ± 10.7</p> <p>Two groups:^a</p> <ul style="list-style-type: none"> - $n = 24$ vegetarians/vegans - $n = 56$ omnivores 	8 weeks	Significant weight loss (4.5 kg for the vegetarian/vegan group and 6.0 for the omnivore group) with no differences between groups	<p>Whole-food plant-based diet</p> <p>Exclusion of added edible oils, solid fats, vegan meat, and cheese replacement foods containing added oils</p> <p>Cooking class sessions for the intervention group</p>

Chainani-Wu et al. (2011)	USA	N = 131 individuals with coronary heart disease; 40.8% males; age: 57.0 ± NR Diet: low-fat plant-based whole-foods <i>No control group</i>	3 months	BMI decreased significantly after 3 months of a low-fat plant-based whole-foods diet (-1.8 points, $p < .001$)	Low-fat and whole-foods diet Encouraged to perform a minimum of 3 hours each week of aerobic exercise and practice stress management techniques at least 1 hour each day
Chiarioni et al. (2021)	Italy	N = 32 patients affected by NAFL; 59.4% males; 30–76 years; 49.91 ± 11.9 Diet: vegan <i>No control group</i>	6 months	BMI decreased significantly after 6 months of a vegan diet (-1.7 points, $p < .001$)	The caloric intake was tailored by the dietitian for the overweight patients (1500–1800 kcal) Instructed to increase their level of physical activity, but no advice on specific training was provided
Cohen et al. (2017)	Australia	N = 37 participants recruited from guests attending a regularly scheduled 7-day program; 35.1% males, age: 48.7 ± 14.7 Diet: mainly plant-based diet including fish and egg protein <i>No control group</i>	7 days	Significant weight loss after the 7-day program (1.6 kg, $p < .001$)	No added sugar or salt No gluten, dairy, caffeine, alcohol, red meat, or canned or packaged food Residential program: all food, beverages, and a wide range of activities were provided, including physical ones

Dinu et al. (2020)	Italy	N = 118 clinically healthy overweight and obese adults; 21–75 years Two groups: - <i>n</i> = 53 Mediterranean diet (age: 52.0 ± NR) - <i>n</i> = 54 vegetarian diet (age: 50.5 ± NR)	3 months	Significant weight loss (1.8 kg for the Mediterranean diet group and 1.9 kg for the vegetarian group) with no significant differences between groups	Program with a detailed 1-week menu plan
Elkan et al. (2008)	Sweden	N = 58 patients with rheumatoid arthritis; 20–69 years Two groups: - <i>n</i> = 30 gluten-free vegan diet (age: 49.9 ± NR) - <i>n</i> = 28 non-vegan diet (age: 50.8 ± NR)	12 months	Significant weight loss for the vegan group (4.2 kg) but not for the non-vegan group (0.7 kg). Significant differences between groups (<i>p</i> < .005)	Vegan and gluten-free diet
Garousi et al. (2021)	<i>Not specified</i>	N = 75 overweight and obese adults with NAFLD; 48% males; 20–55 years Two groups: - <i>n</i> = 38 standard weight-loss diet (age: 42.8 ± 9.9) - <i>n</i> = 37 lacto-ovo-vegetarian diet (age: 43.5 ± 9.9)	3 months	Significant weight loss within groups (5.9 kg for the lacto-ovo-vegetarian group and 2.2 kg for the standard weight-loss group, <i>p</i> < .001) and between groups (<i>p</i> < .001)	Both diets were calorie-restricted (-500 kcal)
Jakse et al. (2019)	Slovenia	N = 36 adults; 30.6% males; ≥ 18 years, mean: 38.3 ± 9.9 Diet: plant-based <i>No control group</i>	10 weeks	Significant weight loss (2.6 kg in phase 1, <i>p</i> < .001 and 3 kg in phase 2, <i>p</i> < .01) with a change from overweight to the normal range at the end of the 10-week program (26.5 vs. 23.4)	Low-fat, high-fiber, predominantly whole-food plant-based diet Meat was allowed (but not recommended) once weekly to relieve social pressure

					Meal replacements Encouraged to engage in at least two weekly sessions of 45 min of moderate-intensity exercise
Jakse et al. (2017)	Slovenia	N = 325 adults; 13% males; 18–71 years Two groups: - <i>n</i> = 241 low-fat, plant-based diet supplemented with two daily meal replacements (age: 42.0 ± NR) - <i>n</i> = 84 control group (age: 41.0 ± NR)	10 weeks	Significant weight loss for the intervention group (5.6 kg, <i>p</i> < .001), not for the control group (1.1 kg). Significant differences between groups (<i>p</i> < .001)	Meat was allowed (but not recommended) once weekly to relieve social pressure Meal replacements Encouraged to engage in at least two weekly sessions of 45 min of moderate-intensity exercise
Jenkins et al. (2014)	Canada	N = 39 overweight participants; 38.5% males Two groups: - <i>n</i> = 20 low-carbohydrate vegan diet (age: 55.3 ± 1.8) - <i>n</i> = 19 high-carbohydrate vegan diet (age: 57.6 ± 1.4)	6 months	Significantly higher weight loss for the low-carbohydrate vegan diet than for the high-carbohydrate vegetarian diet (6.9 kg vs. 5.8 kg, <i>p</i> < .05)	Encouraged to eat only 60% of their estimated caloric requirements to continue the body-weight reduction started in their metabolic phase Different distribution of macro-nutrients according to the group

Jenkins et al. (2009)	Canada	<p>N = 44 overweight hyperlipidemic patients; 44% males; 21–70 years</p> <p>Two groups: - n = 22 low-carbohydrate plant-based diet (age: 56.1 ± 7.5) - n = 22 high-carbohydrate plant-based diet (age: 57.8 ± 7.1)</p>	4 weeks	<p>No significant difference in weight loss between groups (3.9 kg for the low-carbohydrate plant-based diet group and 4.2 kg for the high-carbohydrate plant-based diet group)</p>	<p>60% of calorie requirements covered Food was provided Different distribution of macro-nutrients according to the group</p>
Kaartinen et al. (2000)	Finland	<p>N = 33 fibromyalgia patients; 0% males; 34–62 years</p> <p>Two groups: - n = 18 vegans (age: 51.0 ± NR) - n = 15 omnivores (control group; age: 52.0 ± NR)</p>	3 months	<p>Significant weight loss for the vegan diet group ($p < .001$) with a change from overweight to the normal range at the end No weight loss for the control group Weight gain after the intervention period (gradually adding fish and/or meat to the diet)</p>	Strict, low-salt, uncooked vegan diet
Kahleova et al. (2020)	USA	<p>N = 244 overweight and obese adults; 13% males; 25–75 years</p> <p>Two groups: - n = 122 low-fat vegan diet (age: 53.0 ± 10.0) - n = 122 control group diet (age: 57.0 ± 13.0)</p>	16 weeks	<p>Significantly higher weight loss in the low-fat vegan diet group than in the control group (6.4 kg vs. 0.5 kg, $p < .001$)</p>	Low-fat vegan diet
Kahleova et al. (2018a and b)	USA	<p>N = 75 overweight and obese adults; 11% males, age: 53.2 ± 12.6</p> <p>Two groups: - n = 38 low-fat vegan diet (age: 54.6 ± 7.8) - n = 37 control group (age: 57.7 ± 4.9)</p>	16 weeks	<p>Significant weight loss in the vegan group (6.5 kg, $p < .001$), not in the control group</p>	Low-fat vegan diet

Kahleova et al. (2011)	USA	<p>N = 74 overweight and obese adults with type 2 diabetes treated by oral hypoglycemic medication; 47.3% males; 30–70 year</p> <p>Two groups: - n = 37 vegetarian diet (age: 54.6 ± 7.8) - n = 37 conventional diabetic diet (control group; age: 57.7 ± 4.9)</p>	24 weeks	<p>BMI decreased significantly in both groups (-2.2 points in the vegetarian group and -1.0 point in the control group, $p < .001$) but was higher in the vegetarian diet group ($p < .001$)</p>	<p>Both diets were designed to be isocaloric and calorie restricted (-500 kcal per day)</p> <p>Meals were provided</p> <p>The second 12 weeks of the diet were combined with aerobic exercise</p> <p>Limited alcohol (1/day for women and 2/day for men)</p>
Kent et al. (2013)	USA	<p>N = 5,046 self-selected participants; 33.5% males; age: 57.3 ± 12.9)</p> <p>Diet: low-fat, plant-based diet ad libitum</p> <p><i>No control group</i></p>	30 days	<p>BMI decreased significantly after the 30-day intervention (-1.0 point, $p < .001$)</p> <p>Significant reduction in the number of participants who met the metabolic syndrome criteria for BMI (i.e., central obesity >30 kg/m²)</p>	<p>Encouraged to practice physical activity (30 minutes/day) and stress-management techniques</p> <p>Limited added sugar, sodium, and cholesterol (recommendation)</p>
Lee et al. (2017)	Korea	<p>N = 30 undergraduate and high-school students; 0% males</p> <p>Two groups: - n = 16 vegetarian diet (age: 19.9 ± 1.2) - n = 14 control group (age: 20.1 ± 1.1)</p>	10 days	<p>Significantly higher weight loss in the intervention group than in the control group (1.1 kg vs. 0.3 kg, $p < .001$)</p>	<p>Combination of a vegetarian diet, physical activity (23 hours over the 10-day period), cooking practice (no industrial meal), and various lectures related to healthy lifestyle only for the intervention group</p>

Mahon et al. (2007)	USA	<p>N = 54 overweight and obese postmenopausal women; 0% males; 50–80 years, mean: 58.0 ± 2.0</p> <p>Three groups:^a</p> <ul style="list-style-type: none"> - n = 14 beef diet - n = 15 chicken diet - n = 14 carbohydrate/fat foods diet - n = 11 control group 	11 weeks	Significantly higher weight loss in the intervention groups than in the control group (5.6–7.9 kg vs. 1.2 kg, $p < .05$), with a greater BMI reduction in the chicken group than in the carbohydrate/fat foods group (7.9 kg vs. 5.6 kg, $p < .05$)	<p>Diet with 1250 kcal/day (including 250 kcal/day for beef, chicken, or vegetarian proteins)</p> <p>Dietary counseling, written instructions, menus, and shopping lists were provided to self-purchase, prepare, and consume portioned quantities of foods and beverages for the 1000 kcal/day basal diet</p>
McDougall et al. (2014)	USA	<p>N = 1,615 patients (no particular characteristics); 34.9% males; age: 58.0 ± 18.0</p> <p>Diet: low-fat plant-based</p> <p><i>No control group</i></p>	7 days	Significant weight loss after the 7-day program (1.4 kg, $p < .001$) among both males and females	<p>Low-fat diet with no isolated vegetable oils</p> <p>Prepared meals</p> <p>Opportunities given for light to moderate exercise</p> <p>Residential program</p>
Mishra et al. (2013)	USA	<p>N = 291 overweight and obese adults and/or with a previous diagnosis of type 2 diabetes; 17.2% males; ≥ 18 years</p> <p>Two groups:</p> <ul style="list-style-type: none"> - n = 149 low-fat vegan diet (age: 44.3 ± 15.3) - n = 149 control group (age: 46.1 ± 13.6) 	18 weeks	Significantly higher weight loss in the vegan group than in the control group (2.9 kg vs. 0.1 kg, $p < .05$)	Encouraged to minimize added oils, with a target of 3 g of fat per serving

Neacsu et al. (2014)	UK	N = 20 obese adults; 100% males; 34–71 years, mean: 51.6 ± 11.4 Two groups: ^{a,b} - n = vegetarian HPWL diet (soy-based) - n = meat-based HPWL diet (meat-based)	2 weeks	No difference in weight loss between groups (2.4 kg for the vegetarian group and 2.3 kg for the meat-based group)	High-protein weight-loss diets
Phillips et al. (2004)	UK	N = 33 healthy adults; 21.2% males, 18–42 years Diet: vegetarian <i>No control group</i>	6 months	No difference in weight loss between the pre- and post-intervention diet	At baseline, 18 subjects reported that they had already stopped eating meat for 3 months
Rogerson et al. (2018)	UK	N = 23 healthy adults; 26.1% males; 18–35 years Two groups: - n = 12 Mediterranean diet (age: 25.0 ± 2.6) - n = 11 vegetarian diet (age: 26.0 ± 4.3)	4 weeks	Significant weight loss in the vegetarian group (1.1 kg, $p < .005$), not in the Mediterranean group (0.2 kg) Significantly higher weight loss in the vegetarian group than in the Mediterranean group (-1.1 kg vs. +0.2 kg, $p < .05$)	
Rosell et al. (2006)	UK	N = 21,966 adults; 24.5% males; 20–69 years (at baseline); age: 43.8 ± NR Two groups: ^a - n = 10,784 meat eaters - n = 2,504 fish eaters - n = 5,277 vegetarians	5 years	Significantly lower mean annual weight gain in fish eaters (women only), vegetarians (women only), vegans (men only), and the converted group (both genders) compared to meat eaters	

		<ul style="list-style-type: none"> - $n = 1,826$ reverted (returned to omnivorous diet) - $n = 966$ converted (transitioned to a vegan diet) 			
Shah et al. (2018)	USA	<p>N = 100 participants with coronary artery disease; 85% males; 53–68 years</p> <p>Two groups:</p> <ul style="list-style-type: none"> - $n = 50$ vegan diet (age: $63 \pm \text{NR}$) - $n = 50$ AHAR-D diet (control group; age: $59.5 \pm \text{NR}$) 	8 weeks	Significant reduction in BMI (-1.5 points in both groups) with no difference between groups	Groceries were provided on a weekly basis, as well as a cookbook, handouts on nutrition, a 2-week sample menu, a food scale, measuring spoons, and measuring cups
Sofi et al. (2018)	Italy	<p>N = 118 clinically healthy overweight adults; 22% males; 18–75 years, mean</p> <p>Two groups:</p> <ul style="list-style-type: none"> - $n = 60$ low-calorie vegetarian diet (age: $49.5 \pm \text{NR}$) - $n = 58$ Mediterranean diet (age: $52 \pm \text{NR}$) 	3 months	Significant weight loss within groups (1.9 kg in the low-calorie vegetarian group and 1.8 kg in the Mediterranean diet group) with no difference between groups	Both diets were low calorie
Turner-McGrievy et al. (2015)	USA	<p>N = 63 overweight and obese adults; 27% males; 18–65 years</p> <p>Five groups:</p> <ul style="list-style-type: none"> - $n = 12$ low-fat vegan diet (age: 48.2 ± 2.0) - $n = 13$ vegetarian diet (age: 53.0 ± 1.1) - $n = 13$ pesco-vegetarian diet (age: 48.8 ± 2.2) - $n = 13$ semi-vegetarian diet (age: 42.7 ± 2.7) 	6 months	<p>Significant weight loss within groups at 2 months and 6 months ($p < .01$)</p> <p>Significantly greater weight-loss difference in the vegan group than in the omnivore group at 2 months (4.8% vs. 2.2%, $p < .01$) and in the pesco-, semi-, and omnivore groups</p>	Low-glycemic index and low-fat foods

		- <i>n</i> = 12 omnivore diet (age: 51.0 ± 2.5)		at 6 months (7.5% vs. 3.2% and 3.1%, <i>p</i> < .05)	
Turner-McGrievy et al. (2014)	USA	N = 18 overweight and obese women with polycystic ovary syndrome; 0% males; 18–35 years Two groups: - <i>n</i> = 9 vegan diet (age: 28.1 ± 4.4) - <i>n</i> = 9 low-calorie diet (age: 27.4 ± 5.0)	6 months	Significantly higher weight loss in the vegan group than in the low-calorie group (1.8% by weight vs. 0.0%, <i>p</i> < .05) No difference between groups at 6 months	Vegan recipe book and a list of high-GI foods to limit and foods to include for the vegan group Daily caloric goal based on body weight at baseline for the control group
Turner-McGrievy et al. (2007)	USA	N = 62 overweight and obese postmenopausal women; 0% males; 44–73 years Two groups: - <i>n</i> = 31 low-fat vegan diet (age: 57.4 ± 4.7) - <i>n</i> = 31 NCEP-II diet (age: 55.7 ± 6.4)	14 weeks	After 1 intervention year, significant weight loss within groups (4.9 kg in the vegan group and 1.8 kg in the NCEP-II group, <i>p</i> < .05). Significant difference between groups (<i>p</i> < .05) After 2 intervention years, weight gain for the NCEP-II group and pursuit of weight loss for the vegan group (<i>p</i> < .05)	Low-fat diets Encouraged to limit high-fat plant foods such as avocados, nuts, and seeds

Turner-McGrievy et al. (2004)	USA	N = 59 overweight and obese postmenopausal women; 0% males; 44–73 years Two groups: - <i>n</i> = 29 low-fat vegan diet (age: 57.4 ± 4.8) - <i>n</i> = 30 NCEP-SII diet (age: 55.6 ± 6.5)	14 weeks	Significant weight loss in the vegan group (5.8 kg) and the NCEP-II group (3.8 kg) Significantly higher weight loss between groups (5.8 kg vs. 3.8 kg, <i>p</i> < .05)	Low-fat diets
Wright et al. (2017)	New Zealand	N = 65 overweight and obese adults with type 2 diabetes, ischemic heart disease, hypertension, or hypercholesterolemia; 40% males; 35–70 years Two groups: - <i>n</i> = 33 low-fat vegan diet (age: 56.0 ± 9.9) - <i>n</i> = control group (age: 56.0 ± 9.5)	12 months	BMI decreased significantly in the intervention group at 3, 6, and 12 months (<i>p</i> < .001) No difference in the control group Significantly higher weight loss in the vegan group than in the control group at 6 months (12.1 kg vs. 1.6 kg, <i>p</i> < .001)	Low-fat diet Encouraged to avoid refined oils, high-fat plant foods such as nuts and avocados, and highly processed foods
Yadav et al. (2016)	USA	N = 53 adults with multiple sclerosis; 18–70 years Two groups: - <i>n</i> = 26 very-low-fat plant-based diet (age: 40.8 ± 8.9) - <i>n</i> = 27 control group (age: 40.9 ± 8.5)	12 months	BMI decreased significantly in the plant-based diet group (-1.6 points, <i>p</i> < .001), not in the control group No difference in BMI between groups at 12 months	Low-fat plant-based diet with no vegetable oils Encouraged to perform at least 30 minutes of moderate-intensity activity at least 5 days a week in both group

BMI: Body Mass Index; NAFLD: non-alcoholic fatty liver disease; NCEP-SII: National Cholesterol Education Program Step.

NB: ^a: the mean age of the groups was not mentioned; ^b: the number of participants in the groups was not specified.

All the information listed in the studies is presented. Any missing information was not provided in the studies.

Table 3. Studies investigating vegetarianism and eating disorders, 2000–2022.

Reference	Country	Design	Population	Recruitment procedure	Diet assessment	Measures	Main findings
Bardone-Cone et al. (2012)	USA	Case control	N = 160; 0% males; 16-40 years Two groups: - <i>n</i> = 67 with no eating disorder history (age: 19.5 ± 1.9) - <i>n</i> = 93 with eating disorder history (age: 23.6 ± 4.8)	Patients recruited from a specialized pediatric and adolescent clinic Controls without EDs recruited at the same clinic and at university	Self-reported to have been a vegetarian (at large)	Clinical diagnosis with the Structured Clinical Interview for DSM-IV EDE-Q EDLIFE	Compared to controls, individuals with a history of ED were more likely to have been vegetarian (<i>p</i> < .001), currently be vegetarian (<i>p</i> < .05), and be primarily motivated by weight control in their food choices (<i>p</i> < .05)
Barthels et al. (2018)	Germany	Cross-sectional study	N = 351; 36% males (1% not specified gender) Four groups: - <i>n</i> = 63 vegans (age: 28.7 ± 8.6) - <i>n</i> = 114 vegetarians (age: 30.7 ± 10.1) - <i>n</i> = 83 infrequent meat eaters (age: 37.0 ± 13.7)	General population via bulletin boards and social media	Self-reported vegetarian or vegan diet Frequency of consumption of different food categories (animal-product food habits)	DOS RS	No differences between vegans and vegetarians in orthorexic behavior, but both scored higher than those consuming red meat No difference regarding restrained eating

			- <i>n</i> = 91 frequent meat eaters (age: 33.0 ± 11.0)				
Bas et al. (2005)	Turkey	Cross-sectional study	N = 1,205; 50% males; 17–21 years, mean: 21.5 ± 1.9 Two groups: ^a - <i>n</i> = 31 vegetarians - <i>n</i> = 1,174 non-vegetarians (no details about the diet)	College students recruited in private and public universities	Self-reported vegetarian diet (Yes/No)	EAT-26	Vegetarians had higher scores on EAT-26 total, dieting, and oral-control subscales than non-vegetarians (<i>p</i> < .05 for males; <i>p</i> < .001 for females) 45% of the vegetarians were at risk of ED (score over 20 at the EAT-26) vs. 10% of non-vegetarians (No indicator of significance reported)
Brytek-Matera (2020a)	Poland	Cross-sectional study	N = 370 ^b Two groups: - <i>n</i> = 188 vegetarians (age: 28.9 ± 10.3) - <i>n</i> = 182 omnivores (age: 27.1 ± 8.9)	General population via restaurants, posters, and social media	Self-reported vegetarian diet (Yes/No)	TFEQ-R18 EHQ	Vegetarians were more likely to engage in orthorexic eating behavior but presented lower levels of cognitive restraint than omnivores (<i>p</i> < .001)

Brytek-Matera (2020b)	Poland	Cross-sectional study	<p>N = 254^b; ≥ 18 years</p> <p>Three groups:</p> <ul style="list-style-type: none"> - <i>n</i> = 47 vegans (no animal products; age: 30.6 ± 11.6) - <i>n</i> = 100 vegetarians (no meat, poultry, and fish; age: 28.4 ± 8.9) - <i>n</i> = 107 omnivores (age: 28.7 ± 8.9) 	General population via flyers in local health-food stores, vegan or vegetarian restaurants, fitness centers, universities, and social media	Self-reported vegetarian or vegan diets	TFEQ-R18 EHQ	<p>Vegetarians and vegans showed lower cognitive restraint, emotional eating, and uncontrolled eating but more cognition, behaviors, and feelings related to an extreme focus on healthy eating than omnivores (<i>p</i> < .001)</p> <p>Vegans had higher scores than vegetarians on knowledge of healthy eating and the problems associated with it (<i>p</i> < .001)</p>
Brytek-Matera et al. (2019)	Poland	Cross-sectional study	<p>N = 120^b</p> <p>Three groups:</p> <ul style="list-style-type: none"> - <i>n</i> = 39 vegetarians (excluding meat, poultry, and fish; age: 26.5 ± 8.1) - <i>n</i> = 40 vegans (excluding all animal products; age: 29.7 ± 10.8) - <i>n</i> = 41 omnivores (age: 30.3 ± 10.0) 	General population via restaurants, posters, and social media	<p>Self-reported semi-vegetarian, vegetarian, vegan, fruitarian, or raw food diet</p> <p>Frequency of consumption of different food categories (food habits from 1: never to 5: every day)</p>	TFEQ-R18 EHQ	<p>No differences between groups in TFEQ dimensions</p> <p>Vegans and vegetarians had higher scores than omnivores in orthorexia dimensions, and vegans' scores were higher than vegetarians' only on knowledge of eating habits (<i>p</i> < .05)</p>

							Cognitive restraint was a predictor of orthorexia nervosa in vegans and vegetarians ($p < .001$)
Çiçekoğlu and Tunçay (2018)	Turkey	Cross-sectional study	N = 62; 38.7% males; ≥ 18 years Two groups: - $n = 31$ vegetarians/vegans (age: 32.7 ± 5.6) - $n = 31$ non-vegetarians/non-vegans (no details about the diet; age: 34.4 ± 8.1)	Snowball sampling <i>Not detailed</i>	NR	ORTO-11 EAT-40	No differences in eating attitudes and orthorexia scores between vegetarians/vegans and omnivores
Curtis and Comer (2006)	USA	Cross-sectional study	N = 90; 0% males; 18–57 years Three groups: - $n = 20$ full vegetarians (age: 23.43 ± 7.4)	Students recruited from university, and community members from Boulder	Self-reported vegetarian diet (Yes/No) Description of eating habits without giving a	TFEQ	More dietary restriction in semi-vegetarians motivated by weight control motivated than in those not motivated by weight control ($p < .001$)

			<p>- $n = 16$ semi-vegetarians (age: 26.87 ± 10.8)</p> <p>- $n = 54$ omnivores (age: 23.43 ± 7.4)</p>		defined diet category		Full vegetarians scored lower on dietary restraint than the other groups, with no difference between semi- and non-vegetarians ($p < .01$)
Dell'Osso et al. (2016)	Italy	Cross-sectional study	<p>N = 2,826; 40.6% males; 18–70 years, mean: 28.9 ± 11.4</p> <p>Two groups:^a</p> <p>- $n = 313$ vegetarians/vegans</p> <p>- $n = 2,513$ omnivores</p>	Students and employees recruited from universities	NR	ORTO-15 (cut off 35 and 40) ^c	Vegetarians/vegans scored lower on ORTO-15 ($p < .001$) and had a higher proportion of orthorexia symptoms (No indicator of significance reported)
Dell'Osso et al. (2022)	Italy	Cross-sectional study	<p>N = 2140; 33.9% males; mean age: 23.80 ± 4.80</p> <p>Two groups:^a</p> <p>- $n = 118$ vegetarians or vegans</p> <p>- $n = 1,956$ omnivores</p>	Students recruited from university	Self-reported vegetarian or vegan diet	ORTHO-R	Vegetarians/vegans scored higher on ORTHO-R ($p < .001$) than omnivores

Dittfield et al. (2017)	Poland	Cross-sectional study	<p>N = 2,611; 12.6% males</p> <p>Two groups: - <i>n</i> = 1,346 vegetarians (lacto- and/or ovo-vegetarians, vegans, and others; age: 25.6 ± 8.7) - <i>n</i> = 1,265 non-vegetarians (no details about the diet; age: 23.3 ± 5.9)</p>	General population via the internet	NR	BOT	<p>Health-food fanaticism was more specific to vegetarians (at large) than to non-vegetarians ($p < .01$)</p> <p>Lacto-vegetarians were at higher risk for orthorexia than vegans ($p < .001$)</p>
Dorard and Mathieu (2020)	France	Cross-sectional study	<p>N = 101; 25.7% males; 18–70 years</p> <p>Two groups: - <i>n</i> = 49 vegetarians (age: 28.6 ± 11.6) - <i>n</i> = 52 omnivores (age: 30.3 ± 12.4)</p>	General population via social media	Self-reported with a question about adherence to a vegetarian diet with explicit definitions ranging from flexitarian to vegan diet	EAT-26 BSQ	<p>No difference in EAT-26 total and subscale scores between vegetarians and omnivores</p> <p>Vegetarians had lower scores of body dissatisfaction related to lower body parts and unsuited cognitions and behaviors than omnivores ($p < .05$)</p>

Estima et al. (2012)	Brazil	Cross-sectional study	N = 1,167; 49% males; 14–19 years; 16.0 ± 1.0 Two groups: ^a - n = 48 vegetarians - n = 1,119 non-vegetarians (no details about the diet)	Data from the “Food attitudes and behaviors in adolescents from Sao Paulo – Brazil” study	Self-reported vegetarian diet (Yes/No)	Questions created to assess at-risk eating behavior <i>Unvalidated tools</i>	No relationship between vegetarian status and unhealthy weight-control behavior such as the use of laxatives, diuretics, vomiting, and strict dieting or fasting
Fatima and Ahmad (2018)	Saudi Arabia	Cross-sectional study	N = 314; 0% males; 15–19 years Two groups: - n = 80 at risk for ED according to EAT-26 cut-off score (age: 17.20 ± 1.18) - n = 234 not at risk for ED (age: 17.03 ± 1.25)	Adolescents students recruited from four schools in Arar city	NR	EAT-26	The proportion of vegetarians was higher among participants at risk for ED than among participants not at risk for ED (61.9% vs. 42%, $p = .001$) Vegetarians had higher scores on the EAT-26 total, dieting, and oral-control subscales than non-vegetarians ($p < .05$)

Ferreira and Coimbra (2020)	Portugal	Cross-sectional study	N = 541; 17.4% males; 18–65 years, mean: 36.7 ± 11.8 Four groups: ^a - <i>n</i> = 60 vegans - <i>n</i> = 66 vegetarians - <i>n</i> = 58 paleo - <i>n</i> = 357 omnivores	Portuguese general population	NR	DOS	Omnivores scored lower on DOS than the other groups (<i>p</i> < .001) Vegans scored higher on DOS than omnivores and vegetarians (<i>p</i> < .05)
Fisak et al. (2006)	USA	Cross-sectional study	N = 256; 0% males; age: 21.1 ± 4.0 Two groups: ^a - <i>n</i> = 52 vegetarians (semi-vegetarians, lacto- and/or ovo-vegetarians, vegans) - <i>n</i> = 204 non-vegetarians	Students recruited from psychology classes	Self-reported with a question about adherence to a vegetarian diet with explicit definitions ranging from semi- to vegan diet (Yes/No)	EDI-II DEBQ EAT-40 TFEQ	No differences in eating pathology measures between the vegetarian and non-vegetarian participants
Forestell et al. (2012)	USA	Cross-sectional study	N = 240; 0% males Five groups: - <i>n</i> = 55 vegetarians (age: 19.4 ± 1.5) - <i>n</i> = 28 pescovegetarians (age: 19.8 ± 4.1)	College students recruited from introductory psychology classes	GEH (choose one of the seven diet categories with explicit definitions)	TFEQ FCQ EAT-26	No difference on EAT-26 between the groups Semi-vegetarians and flexitarians were more restrained than omnivores (respectively <i>p</i> < .001 and <i>p</i> < .05) and more motivated by weight

			<ul style="list-style-type: none"> - $n = 29$ semi-vegetarians (age: 19.6 ± 5.9) - $n = 37$ flexitarians (age: 18.5 ± 1.6) - $n = 91$ omnivores (age: 19.1 ± 3.6) 				control (respectively $p < .01$ and $p < .05$)
Gwioździk et al. (2022)	Poland	Cross-sectional study	<p>N = 420; 0% males; 19–30, years, mean: $24 \pm NS$</p> <p>Three groups:</p> <ul style="list-style-type: none"> - $n = 115$ vegetarians - $n = 78$ FODMAP - $n = 227$ omnivores 	Participants recruited via social media	Diet and eating-habit questionnaire designed for the study	SCOFF TFEQ-13 ORTHO-15 (cut-off 35) ^c	<p>No between-group difference regarding eating disorder ($p = .135$), but FODMAP participants had more orthorexia symptoms ($p < .001$)</p> <p>Significant differences were observed in uncontrolled eating ($p = .010$) and emotional eating ($p = .011$) by diets. <i>Post-hoc were not reported</i></p>
Hadigan et al. (2000)	USA	Cross-sectional study	<p>N = 58; 0% males; 18–35 years</p> <p>Two groups:^a</p> <ul style="list-style-type: none"> - $n = 30$ AN patients - $n = 28$ healthy women without current or past ED (control group) 	Clinical and control groups admitted to the Massachusetts General Hospital	Open- and closed-ended questions to determine food intake	Anorexia nervosa with the DSM-IV criteria	The prevalence of vegetarians was higher among the anorexic patients than in the control group (46.7% vs. 14.3%, $p < .01$)

Hanras et al. (2022)	France	Cross-sectional study	<p>N = 48, 16.67% males</p> <p>Four groups:</p> <ul style="list-style-type: none"> - n = 12 vegetarians with obesity (age: 50.0 ± 10.7) - n = 12 omnivores with obesity (age: 50.5 ± 10.7) - n = 12 normal-weight vegetarians (age: 49.2 ± 10.3) - n = 12 normal-weight omnivores (age: 48.6 ± 9.35) 	Participants recruited from two nutrition departments and French general population	<p>Self-reported with a question about the adherence to a vegetarian diet with explicit definitions ranging from flexitarian to vegan diet</p> <p><i>Participants who reported following any type of vegetarian diet were all grouped into one of the "vegetarian" groups</i></p>	MINI DEBQ	<p>The prevalence of binge eating disorder was higher among vegetarians with obesity ($p = .022$)</p> <p>Vegetarians with obesity had higher score of emotional eating than normal-weight omnivores ($p = .018$)</p> <p>Emotional eating was correlated with external eating ($r = 0.64, p < .05$) among vegetarians with obesity</p>
Hansson et al. (2011)	Sweden	Cross-sectional study	<p>N = 131; 0.8% males; 15–50 years</p> <p>Four groups:^a</p> <ul style="list-style-type: none"> - n = 16 AN - n = 18 BN - n = 36 recovered patients - n = 61 control group 	<p>Patients recruited in D specialized units</p> <p>Normal controls recruited in universities and employees</p>	Dietary questionnaire (mixed or vegetarian diet, food preferences)	<p>ED clinical diagnosis using the DSM-IV criteria</p> <p>Severity of the ED symptomatology with the PSR</p> <p>EDI-2</p>	<p>Vegetarianism was more prevalent among current anorexics and recovered patients than in the control group (No indicator of significance reported)</p> <p>Restrictive eating and dieting were more common among vegetarians than among mixed-diet</p>

			<i>Number of vegetarians not specified</i>				participants (70% vs. 42%, $p < .05$)
Heiss et al. (2019)	USA	Cross-sectional study	<p>N = 381; 19.2% males; ≥ 18 years</p> <p>Four groups:</p> <ul style="list-style-type: none"> - $n = 191$ vegans (age: 31.72 ± 12.85) - $n = 50$ lacto-ovo-vegetarians (age: 27.78 ± 9.76) - $n = 34$ meat reducers (age: 35.94 ± 15.05) - $n = 106$ omnivores (age: 29.75 ± 13.28) 	General population recruited from websites and social media	Self-reported with a question about the adherence to a vegetarian diet with explicit definitions ranging from flexitarian to vegan diet	ORTO-15 (cut-off 35 and 40) ^c EDE-Q	Vegans presented fewer symptoms on the EDE-Q than the other groups ($p < .05$) but were more likely to meet the clinical cut-off on the ORTO-15 than omnivores ($p < .01$)
Heiss et al. (2018)	USA	Cross-sectional study	<p>N = 518; 25.4% males; ≥ 18 years</p> <p>Two groups:</p> <ul style="list-style-type: none"> - $n = 318$ vegans (age: 31.76 ± 12.62) 	Participants recruited via social media and websites, flyers in local health-food stores, and from a departmental research pool	Self-reported with a question about the adherence to a vegetarian diet with explicit definitions	EDE-Q	<p>Vegans scored lower on the restraint subscale than omnivores ($p < .001$)</p> <p>No difference for the other subscales</p>

			- <i>n</i> = 200 omnivores (age: 18.86 ± 1.97)				
Heiss et al. (2017)	USA	Cross-sectional study	N = 577; 19.6% males; ≥ 18 years Two groups: - <i>n</i> = 357 vegans (age: 31.31 ± 12.41) - <i>n</i> = 220 omnivores (age: 29.41 ± 12.86)	Participants recruited via social media	Self-reported with a question about the adherence to a vegetarian diet with explicit definitions ranging from flexitarian to vegan diet	EDE-Q DEBQ EDI – Drive for thinness BES YFAS	Vegans scored lower on the EDE-Q than omnivores (<i>p</i> < .05) No group differences on any other eating pathology or eating behavior measure (no statistical analyses for the DEBQ)
Hessler-Kaufmann et al. (2021)	Germany	Cross-sectional study	N = 511; 36.6% males; 18–84 years Three groups: - <i>n</i> = 49 vegetarians (including vegans defined as no meat, no poultry, no fish; age: 33.8 ± 13.0) - <i>n</i> = 98 semi-vegetarians (no red meat but occasionally poultry)	From two studies at the Institute for Nutritional Medicine	NR	DOS	Vegetarians had higher scores on DOS than semi-vegetarians (<i>p</i> < .05) and omnivores (<i>p</i> < .01), no difference between the last two groups

			and/or fish; age: 41.1 ± 18.1) - <i>n</i> = 364 omnivores (age: 45.3 ± 18.2)				
Klopp et al. (2003)	USA	Cross-sectional study	N = 143; 0% males Two groups: - <i>n</i> = 30 vegetarians (age: 19.0 ± 1.0) - <i>n</i> = 113 omnivores (age: 19.0 ± 1.0)	Students recruited from nutrition, psychology, and political science courses	Self-reported vegetarian diet (Yes/No) If “Yes”, an additional question was posed about adherence to a vegetarian diet with explicit definitions	EAT-40	36.7% of the vegetarians were at risk for ED (score over 30 on the EAT-40) compared to 8.8% of non-vegetarian participants (<i>p</i> < .001)
Lindemann et al. (2000)	Finland	Cross-sectional study	N = 118; 0% males; 16-18 years, mean: 16.4 Two groups: ^a	Students recruited from senior high schools	NR	EAT-26	Vegetarians had higher scores on EAT-26 than non-vegetarians (<i>p</i> < .001) 20% of the vegetarians were at risk for ED (score

			<p>- $n = 12.7\%$ vegetarians (no meat, poultry, and fish)</p> <p>- $n = 87.3\%$ non-vegetarians</p>				over 20 on the EAT-26) compared to 3.9% of non-vegetarians (No indicator of significance reported)
			<p>N = 124; 0% males; 17–72 years, mean: 27.2</p> <p>Two groups:^a</p> <p>- $n = 11.3\%$ vegetarians (no red and white meat and fish)</p> <p>- $n = 88.7\%$ non-vegetarians</p>	Students recruited from introductory psychology courses	NR	EAT-26 EDI	Vegetarians had higher scores on EAT-26 and EDI than non-vegetarians ($p < .05$), but no differences were found on the drive for thinness, body dissatisfaction, and bulimia subscales
Luck-Sikorski et al. (2018)	Germany	Population-based telephone survey	<p>N = 1,007; 51.4% males; 50.6 ± 0.8</p> <p>Three groups:^a</p> <p>- $n = 5.9\%$ vegetarian</p> <p>- $n = 3.2\%$ allergy-specific diets</p> <p>- $n = 90\%$ omnivores</p>	German general public via computer-generated telephone numbers called randomly	Self-reported vegetarian or vegan, or adhered to a different kind of diet due to allergies	DOS	Higher rate of orthorexic behavior among vegetarian participants ($p < .05$)

Maïano et al. (2022)	Canada	Cross-sectional study	N = 296; 14.9% males; 18–69.4 years, mean: 34.2 ± 11.9 Two groups: ^a - <i>n</i> = 81.2% of vegetarians - <i>n</i> = 18.8% of non-vegetarians	Participants recruited through generic advertisements sent in a local newspaper, email, and ads posted on social networks and private clinic websites	Self-reported vegetarian diet (Yes/No)	TOS	Vegetarians had higher orthorexia nervosa (<i>p</i> = .010) and healthy orthorexia (<i>p</i> = .001) scores than non-vegetarians
McLean and Barr (2003)	Canada	Cross-sectional study	N = 596; 0% males; ≥ 18 years, mean: 21.5 ± 3.9 Two groups: ^a - <i>n</i> = 47 vegetarians (no meat, poultry, and fish) - <i>n</i> = 549 non-vegetarians	Students recruited in biochemistry, human nutrition, psychology, family science, nursing, and human kinetic classes	Self-reported vegetarian, vegan, or mixed diet	Self-report of diagnosis or treatment for an ED TFEQ	A higher proportion of the vegetarian participants had a history of EDs (17.1% vs. 3.1%, <i>p</i> < .001) Vegetarians had higher restraint scores than non-vegetarians (<i>p</i> = .001)
McLean et al. (2022)	Australia	Cross-sectional study	N = 1,271; 18% males; ≥ 18 years Three groups: - <i>n</i> = 580 vegans (age: 30.34 ± 9.99) - <i>n</i> = 278 vegetarians (age: 29.37 ± 9.48)	Participants recruited from social medias advertisement	Self-reported semi-vegetarian, lacto-vegetarian, or vegan diet Frequency of consumption of different food categories (food	EDE-Q EDE-QS	A higher proportion of eating disorders were found in vegetarians (11.87%) and vegans (13.45%) compared to omnivores (4.84%, <i>p</i> < .001)

			- $n = 413$ omnivores (age: 29.98 ± 10.27)		diary), and recategorization if necessary		Difference was observed for EDE-Q eating concerns subscale according to the type of diets ($p = .017$). <i>Post-hoc were not reported</i>
McLean et al. (2022)	USA; Canada; UK; Australia	Cross-sectional study	<p>N = 228; 48.24% males; most were between 25 and 34 years old</p> <p>Two groups:^a - $n = 110$ vegans (no red meat, poultry, fish/seafood, dairy products, and eggs) - $n = 118$ omnivores (not self-report eliminating any animal products from their diet)</p>	Participants recruited from Amazon Mechanical Turk	Self-reported diet (with precise food categories eliminated)	<p>EAT-26 EDE-Q EPSI</p> <p>Diet motivations (e.g., health, weight control, ethical concerns) Length of vegan adherence</p>	<p>Vegans had higher EAT-26 scores than omnivores ($p = 0.003$), but no difference was observed for the EDE-Q score ($p = 0.13$). The motivations to adopt vegan diet and the diet length were no associated to EAT-26 and EDE-Q scores. <i>No comparison was reported for EPSI scores</i></p> <p>Eating concern, body dissatisfaction, binge eating, cognitive restraint, and purging predicted vegan diet</p>

Missbach et al. (2015)	Germany	Cross-sectional study	<p>N = 1,029; 25.4% males; 19–70 years, mean: 31.2 ± 10.4</p> <p>Three groups:^a</p> <ul style="list-style-type: none"> - n = vegans - n = vegetarians - n = mixed dieters <p><i>Number of participants in the groups not specified</i></p>	Students and employees recruited via online advertisement	Self-reported vegetarian, vegan, or mixed diet	ORTO-15 ^c	Vegetarians and vegans had higher orthorexia nervosa tendencies than mixed dieters ($p < .01$)
Novara et al. (2022)	Italy	Cross-sectional study	<p>N = 1,075; 24,9% males; 18–30, mean: 20.9 ± 2.09</p> <p>Three groups:^a</p> <ul style="list-style-type: none"> - n = 9 vegans - n = 49 vegetarians - n = 1,017 	Students recruited at the University of Padov through a presentation of the study prior to the start classes	Self-reported (with no other details)	EDI-3 EHQ	Vegetarian/vegan diet and ED predicted positively both EHQ total scores and problems subscale score. Vegetarian diet predicted positively knowledge subscale score
Parra-Fernandez et al. (2020)	Spain	Cross-sectional study	<p>N = 466; 24% males; 18–73 years</p> <p>Three groups:</p> <ul style="list-style-type: none"> - n = 101 vegans (age: 33.3 ± 11.1) - n = 119 vegetarians (age: 29.2 ± 11.1) 	Spain residents recruited via social media and local associations	Self-reported (with no other details)	ORTO-11 (cut off < 25) ^c	Vegans were more at risk of ON than the other groups ($p = .01$)

			- <i>n</i> = 256 omnivores (age: 33.0 ± 11.7)				
Paslakis et al. (2020)	Germany	Cross-sectional study	N = 2,449; 46.5% males; 14–91 years, mean: 49.6 ± 17.1 Two groups: ^a - <i>n</i> = 133 vegetarians (including vegetarians defined as no meat and vegans defined as no animal product) - <i>n</i> = 2,316 omnivores	German residents	Self-reported vegetarian or vegan diet (Yes/No)	EDE-Q8	Vegetarians/vegans had higher scores on the EDE-Q (<i>p</i> = .01) A higher EDE-Q score was one of the predictors of vegetarianism/veganism (<i>p</i> < .05)
Perry et al. (2001)	USA	Cross-sectional study	N = 4,746; 50.2% male; 11–18 years; mean: 14.9 Set 1: Two groups: ^a - <i>n</i> = 262 vegetarians - <i>n</i> = 4,258 omnivores	Students recruited in middle and high schools	Self-reported vegetarian diet (Yes/No) If “Yes”, an additional question was posed regarding vegetarian diet	Questions concerning food, weight, and health behaviors Previous ED diagnosis by a physician	Vegetarians were more likely than other participants to develop unhealthy and weight-control behaviors (<i>p</i> < .05) Higher proportion of ED diagnosis among vegetarians than among

			Set 2: Two groups: ^a - $n = 94$ restricted vegetarians - $n = 158$ semi-vegetarians		subcategories based on the food consumed	<i>Unvalidated tools</i>	non-vegetarians ($p < .001$), no differences between restricted vegetarians and semi-vegetarians
Robinson-O'Brien et al. (2009)	USA	Cross-sectional study	N = 2,488; 44.7% males; 15–23 years Three groups: ^a - $n = 108$ current vegetarians - $n = 268$ former vegetarians - $n = 2,112$ never vegetarians	Students and post-high-school students recruited via Project EAT-I	Self-reported vegetarian diet (Yes/No) If “Yes”, question on current or former vegetarian diet	YAFFQ Binge eating and weight-control behavior Yes/No questions <i>Unvalidated tools</i>	Current vegetarians were at increased risk for binge eating with loss of control ($p < .001$), while former vegetarians were at increased risk for extreme unhealthy weight-control behaviors ($p < .01$)
Şentürk et al. (2022)	Turkey	Cross-sectional study	N = 1,165; 17.0% males; ≥ 18 years Three groups: - $n = 415$ vegans (age: 31.09 ± 10.29) - $n = 324$ vegetarians (age: 31.79 ± 9.47)	Participants recruited from social medias advertisement	Self-reported vegetarian or vegan diet (Yes/No)	TOS TFEQ-R21	Vegans and vegetarians had higher orthorexia nervosa ($p < .05$) and healthy orthorexia ($p < .05$) scores than omnivores Vegetarians and omnivores had higher cognitive restraint scores than vegans

			- <i>n</i> = 426 omnivores (age: 31.76 ± 10.45)				(<i>p</i> < .05), and omnivores had also higher uncontrolled eating scores than vegetarians (<i>p</i> < .05) Vegan/vegetarian diet negatively predicted orthorexia nervosa and healthy orthorexia scores
Tannhauser et al. (2001)	Israel	Cross-sectional study	N = 201; 0% males; 13.4–21 years Two groups: - <i>n</i> = 45 AN patients (age: 16.3 ± 1.8) - <i>n</i> = 156 students (control group, <i>matched for age and sociodemographic characteristics</i> ; age: 15.8 ± 0.8)	Outpatients with primary AN admitted to the Eating Disorders Clinic of Ramban Medical Center and normal controls recruited from schools	Questions on food preferences and avoidances	Diagnosis with the DSM-III-R	56% became vegetarians several years before the onset of AN Meat avoidance was 6.5 times more prevalent among AN patients than in the control group (No indicator of significance reported)
Timko et al. (2012)	USA	Cross-sectional study	N = 486; 23% males; ≥ 18 years Four groups: - <i>n</i> = 35 vegans (age: 26.94 ± 7.93)	Recruited in psychology, internet, and health-food store	Self-reported with a question about the adherence to a vegetarian diet FFQ to verify the self-reported diet	DEBQ EAT-26 EDI-3	No difference in EAT-26 scores between groups Vegans and omnivores scored higher on the EDI-3 “drive for thinness” than

			<p>- $n = 111$ vegetarians (age: 26.73 ± 9.08)</p> <p>- $n = 75$ semi-vegetarians (age: 26.65 ± 9.55)</p> <p>- $n = 265$ omnivores (age: 23.44 ± 9.70)</p>				vegetarians and semi-vegetarians ($p < .05$)
			<p>N = 117; 0% males; age: 19.4 ± 2.6</p> <p>Two groups:^a</p> <p>- $n = 44$ semi-vegetarians (no red meat and poultry)</p> <p>- $n = 74$ unrestricted meat eaters</p>	From the psychology department pools of urban universities, via flyers in local health-food stores, on the internet	Self-reported with a question about the adherence to a vegetarian diet FFQ to verify the self-reported diet	Weight and dieting RS EDE-Q	Semi-vegetarians had higher scores on “dietary restraint” and “food concern” EDE-Q subscales than omnivores ($p < .05$), even though these two groups did not differ in BMI
Yackobovitch-Gavan et al. (2009)	Israel	Case control	<p>N = 90; 0% males; ≥ 18 years</p> <p>Three groups:</p> <p>- $n = 36$ remitted AN patients (age: 22.02 ± 2.9)</p> <p>- $n = 23$ AN patients (age: 23.33 ± 3.4)</p> <p>- $n = 31$ healthy women (age: 22.79 ± 1.7)</p>	Patients recruited in the inpatient adolescent ED department, healthy women recruited in universities (control group)	NR	EDI-II CO-Ano EDFHI for ED diagnosis	Logistic regression showed that vegetarianism differentiated remitted from non-remitted patients ($p < .01$)

Zickgraf et al. (2020)	USA	Cross-sectional study	N = 9,910; 44.4% males; ≥ 18 years, mean: 23.4 ± 5.8 Three groups: ^a - $n = 413$ vegetarians motivated by weight control - $n = 555$ vegetarians not motivated by weight control - $n = 8,926$ non-vegetarians (no details about the diet)	Students recruited from colleges and universities across the US	Self-reported vegetarian diets (“Do the following eating practices apply to you?”; e.g., “I am a vegetarian”)	S-EDE-Q	Weight-motivated vegetarians had higher scores on S-EDE-Q “restraint,” “shape/weight overvaluation,” and “body dissatisfaction” subscales than non-vegetarians and non-weight-motivated vegetarians (which did not differ) ($p < .05$)
Zuromski et al. (2015)	USA	Cross-sectional study	N = 278; 0% males Three groups: - $n = 69$ in the clinical group (age: 26.8 ± 7.4) - $n = 136$ in the subclinical group (age: 19.5 ± 1.5) - $n = 73$ in the non-clinical group (age: 19.4 ± 2.3)	Patients receiving residential treatment at an ED center and general population recruited at university	Vegetarianism questionnaire (type of food consumed, used to derive several vegetarian groups; self-reported current and lifetime vegetarian)	EDE-Q Lifetime disordered eating items (exclusion criteria for the non-clinical group)	The proportion of current and lifetime vegetarians (self-reported), vegans, and lacto-ovo-vegetarians (type of consumed food) was higher in the clinical group than in the other two ($p < .05$)

AN: anorexia nervosa; BES: Binge Eating Scale; BN: bulimia nervosa; BOT: Bratman Orthorexia Test; DEBQ: Dutch Eating Behavior Questionnaire; DOS: Düsseldorf Orthorexia Scale; EAT: Eating Attitude Test; EDDS: Eating Disorder Diagnostic Scale; EDE-Q: Eating Disorder Examination Questionnaire; EDE-QS: Eating Disorder Examination-Questionnaire Short; EDFHI: Eating Disorders Family History Interview; EDI: Eating Disorder Inventory; EDLIFE: Eating Disorders Longitudinal Interval

Follow-up Evaluation; EHQ: Eating Habits Questionnaire; ELIFE: Eating Disorders Longitudinal Interval Follow-up Evaluation; EPSI: Eating Pathology Symptoms Inventory; FFQ: Food Frequency Questionnaire; GEH: General Eating Habits; MINI: Mini International Neuropsychiatric Interview; ORTO-11/ORTO-15/ORTHO-R: questionnaire for the diagnosis of orthorexia; Project EAT: Project Eating Among Teens; PSR: Psychiatric Status Rating Scale; RS: Restraint Eating Scale; SCOFF: Sick, Control, One, Fat and Food; TFEQ: Three Factor Eating Questionnaire; TOS: Teruel Orthorexia Scale; YAFFQ: Youth and Adolescent Food Frequency; YFAS: Yale Food Addiction Scale.
NB: ^a: the mean age of the groups was not mentioned; ^b: no details on the gender of the participants; ^c: low ORTHO-11/ORTHO-15 scores are indicative of orthorexic behavior. All the information listed in the studies is presented. Any missing information was not provided in the studies.