



Psychosocial Interventions for Food Addiction: a Systematic Review

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Abstract

Purpose of Review The current systematic review examined the empirical literature on psychosocial interventions for food addiction with the goal of providing recommendations for clinical practice and future research. A PsycINFO and PubMed search of publications was conducted in September 2019. Two authors assessed retrieved titles and abstracts to determine topic relevance and rated the quality of the included studies using an established checklist.

Recent Findings Eight studies met the study inclusion criteria, and study quality ranged from “poor” to “fair”. Most studies were pilot and feasibility studies with limitations that impact the conclusions that can be drawn.

Summary There are currently no empirically supported psychosocial interventions for food addiction. Additional research is warranted to develop and test the efficacy of interventions for food addiction. In the meantime, it is recommended that clinicians treating food addiction assess for comorbid eating disorders, and if present, first provide evidence-based treatments for those conditions.

Keywords Food addiction · YFAS · Compulsive eating · Intervention · Treatment · Psychotherapy

Introduction

Research examining the validity of food addiction has proliferated in recent years [1–4], particularly since the publication of the Yale Food Addiction Scale (YFAS) [5] in 2009 [6]. The debate has focused primarily on whether certain processed, hyperpalatable foods have an addictive potential. Although food addiction is not included as a diagnosis in the DSM-5 [7], the fact remains that a sizable percentage of the population self-identify as a “food addict” and/or exceed the cutoff for “food addiction” according to the YFAS and YFAS2.0 [8–10]. A meta-analytic review of food addiction reported an overall prevalence of 19.1% across studies, and 57.6% among samples with bulimia or binge eating disorder [11]. Of those who exceed the YFAS cutoff for food addiction, the majority report

“severe” food addiction symptoms (i.e. endorse ≥ 6 of 11 symptoms) and significant distress/impairment [10].

In comparison with the body of research examining the validity of food addiction, research on its clinical utility has lagged far behind. One primary purpose of assessment and diagnosis is to inform clinical decision-making regarding the intervention plan. If an individual seeks treatment for food addiction, what type of intervention should be recommended? Similar to the validity of food addiction, the treatment implications of food addiction have generated much controversy. Some argue that if certain foods have an addictive potential, then individuals with food addiction should abstain from those refined and hyperpalatable foods [12], whereas others argue that many existing evidence-based treatments for substance use disorders [13] do not require abstinence, and evidence-based treatments for disordered eating [14] encourage the consumption of all foods in moderation and teach coping skills to reduce vulnerability to dysregulated eating [15, 16, 17]. More recently, some authors have provided recommendations for incorporating the concept of food addiction into treatment for disordered eating [18•, 19•]. Despite the thoughtful reviews and commentaries on the clinical implications of food addiction [20, 21, 22•, 23•, 24•] and the controversy regarding recommended treatment approaches, our impression was that very little empirical research had been published on the topic. Accordingly, the purpose of this systematic review was to

This article is part of the Topical Collection on *Food Addiction*

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examine the empirical literature on psychosocial interventions for food addiction with the goal of providing recommendations for clinical practice and future research.

The Present Study

The aims of the current systematic review were threefold: (1) to describe the psychosocial interventions for food addiction that have been examined in the published literature, (2) to examine their impact on food addiction symptoms and other related domains, and (3) to assess the quality of the studies using an established rating tool [25].

Method

A systematic literature search of peer-reviewed publications was performed in accordance with the Preferred Reporting Items for Systematic Reviews and Meta-Analysis (PRISMA) statement [26] in September 2019. The search was conducted in PsycINFO and PubMed. The following search terms were utilized: (“intervention” OR “therap*” OR “treatment” OR “psychotherapy” OR “counsel*” OR “12 step” OR “12-step”) and (“food addict*” OR “YFAS” OR “eating addict*” OR “compulsive overeat*” OR “compulsive eat*”). Books were excluded from PsycINFO search results, and the search was restricted to Medical Subject Headings (MeSH) terms in PubMed. Reference lists of the included studies in the present review were also examined to identify additional potential studies.

Study Selection Criteria

Eligible articles were screened by two authors to assess suitability for inclusion. Papers were included if the following inclusion criteria were met: (1) written in English, (2) examined a psychosocial intervention (i.e. interventions without a psychosocial component that focused purely on dietary advice or physical activity were not included), and (3) conducted an empirical study that reported food addiction as an outcome variable. All study designs except for qualitative studies, case studies/series, and study protocols without empirical data were considered in this review. Articles were excluded based on title screening, abstract screening, and full-text review. Figure 1 presents a flow diagram of the included studies selected for review.

Data Extraction

After the outlined screening procedures, full papers were examined to determine eligibility. Study design, study location, sample size, intervention characteristics, target population, baseline patient characteristics, and therapist training were

extracted from the included articles. Data on food addiction outcomes along with other relevant outcomes (eating pathology, dietary behaviours, psychological functioning, weight) were also extracted.

Assessment of Methodological Quality of Selected Studies

The methodological quality of each study was assessed by two raters using the Downs and Black Checklist [25]. The checklist assesses items under the following subscales: reporting, external validity, internal validity, and power. A modified version of the power item was used [27]. Total scores range from 0 to 28, with higher scores indicating better study quality. Psychometric properties including test-retest reliability ($r = .88$), inter-rater reliability ($r = .75$), and internal consistency (Kuder-Richardson formula $20 = .89$) of this instrument are good [25]. In the present study, percent agreement between the two raters across all of the coding decisions was 88%. Discrepancies in coding decisions were discussed in order to reach consensus. Similar to previous research [28], total scores were given a corresponding study quality level to facilitate interpretation: “poor” (0 to 14), “fair” (15 to 19), “good” (20 to 25), “excellent” (26 to 28). Inter-rater reliability calculated using Krippendorff’s alpha [29] was 1.0, indicating perfect agreement between the two raters regarding the quality level of each study.

Results

Initial searches yielded 1257 publications with removal of duplicate articles, of which 84 were selected for full-text screening. The review process resulted in the selection of 8 articles that met the inclusion criteria. The characteristics of the included studies are presented in Table 1, and details of the study interventions and outcomes are presented in Table 2.

Methodological Quality of Selected Studies

Quality ratings of the included studies are presented in Table 1. Rating total scores ranged from 10 (“poor”) to 19 (“fair”). Notably, no studies measured therapist adherence in delivering the intervention. Nearly all studies failed to report the number of individuals asked to participate and the number who agreed/disagreed to participate, which may represent a sampling bias. Food addiction outcomes across all studies were based on patient self-report, indicating that patients were not blind to the outcome. Lastly, only one study conducted a power calculation prior to analyses [33], and the majority of studies conducted analyses with completer data only. The results below should be considered with these methodological limitations in mind.

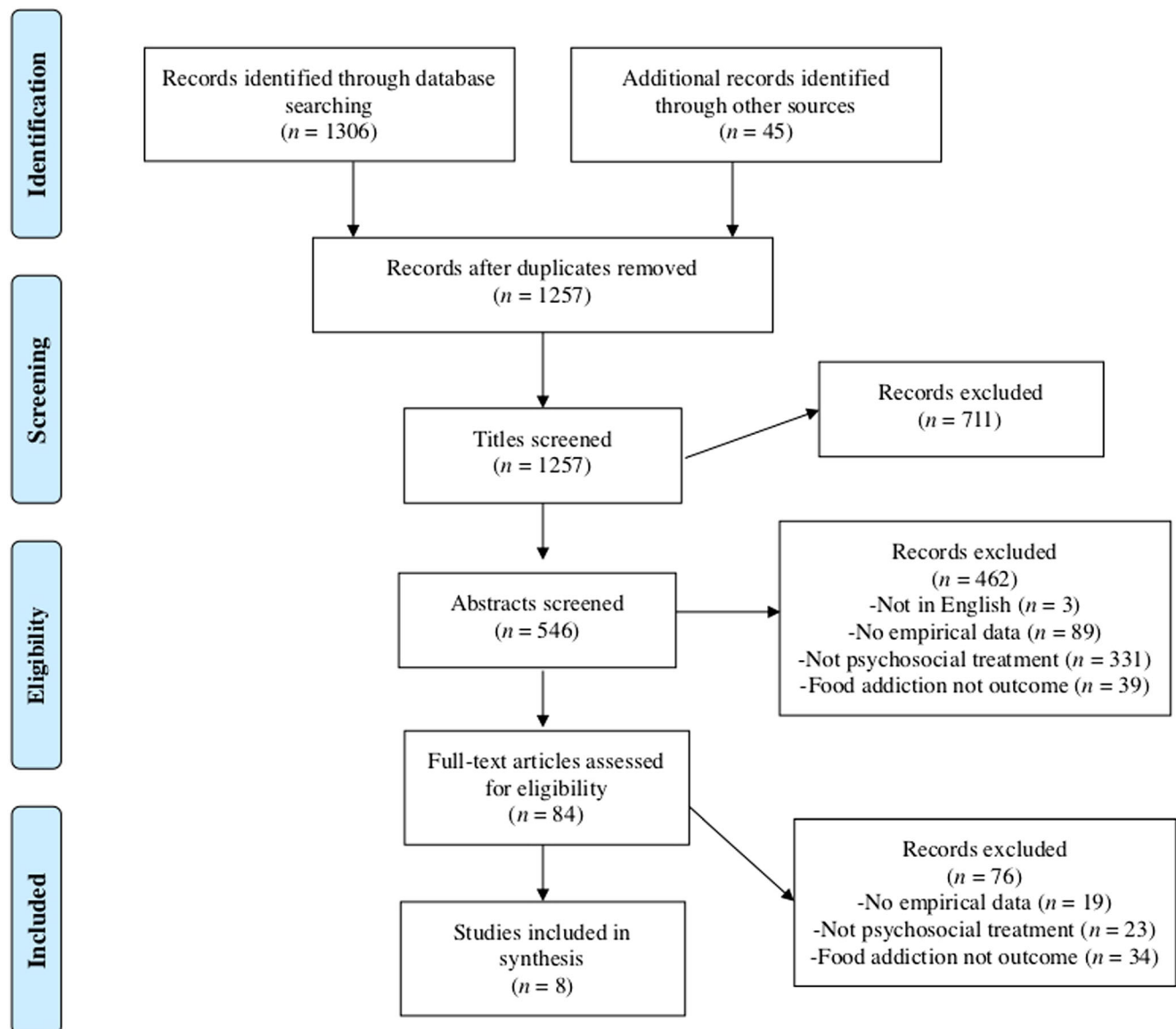


Fig. 1 PRISMA flow diagram of literature search

Study Characteristics

With the exception of one study conducted with adolescents, the remainder of the interventions were tested with adults. The samples were predominantly female, ranging from 69 to 100% across studies that reported participant demographics. Only two studies specifically recruited samples with addictive-like eating as part of the inclusion criteria, defined as self-referring to an Overeaters Anonymous group for compulsive overeating [32] or exceeding the YFAS cutoff [35]. The remainder of the studies recruited individuals with bulimia nervosa from an eating disorders program [33] or adults with overweight/obesity from a weight loss treatment program [30, 37] or from the community [31, 34, 36]. Although food addiction was not an inclusion criterion in those studies, mean

baseline scores exceeded the YFAS cutoff in several of the studies [33, 36, 37].

Impact of the Interventions

Abstinence-Based Interventions Among Individuals With Food Addiction

Two of the included studies examined an addiction-model abstinence-based intervention among individuals with food addiction. Weinstein et al. [32] conducted a cross-sectional study comparing three groups of female “compulsive eaters” attending at an Overeaters Anonymous self-help group ($N = 60$) who had just started the program, had been attending the program for 1 year, or had been attending the program for 5 years. Members of Overeaters Anonymous are expected to

Table 1 Characteristics of studies included in systematic review

Study	Location	Mean age (years)	Gender (% female)	Baseline food addiction severity, mean (SD)	Inclusion criteria	Quality ratings
1. Mount et al. [30]	USA	42.0	77.9	EOC total = 31.0 (13.0)	Adults; ≥ 40 lbs overweight	14
2. Mason et al. [31]	USA	46.7	100.0	YFAS count = 3.0 (1.6)	Adult women; BMI = 30–45.9 kg/m ² ; abdominal obesity (waist circumference > 88 cm)	19
3. Weinstein et al. [32]	NR	52.6	100.0	YFAS total = 36.0 (18.7)	Adult women; members of Compulsive Eaters Anonymous group	11
4. Hilker et al. [33]	Spain	29.2	100.0	YFAS count = 6.1 (1.2)	Adult women; meet DSM-5 criteria for bulimia nervosa	18
5. Sawamoto et al. [34]	Japan	48.1	100.0	YFAS count = 2.1 (1.5)	Adult women; BMI ≥ 25 kg/m ² ; no physical impairment that would preclude simple exercise	18
6. Vidmar et al. [35]	USA	14.4	60.0	55% of app group scored ≥ 4.0 on YFAS-c count	Adolescents (12–18 years); exceed YFAS-c cutoff for food addiction	17
7. Webber et al. [36]	USA	53.8	69.0	YFAS count = 3.3 (1.9)	Adults; BMI = 30–40 kg/m ²	19
8. Miller-Matero et al. [37]	USA	48.9	80.4	YFAS count = 4.0 (1.4)	NR	10

NR, not reported; BMI, body mass index; EOC, total score on Eating Obsessive Compulsive Questionnaire; YFAS count, number of food addiction symptoms endorsed (≥ 3 for food addiction “diagnosis”); YFAS total, total score on YFAS.

Quality ratings refer to scores on the Downs and Black Checklist (Downs & Black, 1998). Possible scores range from 0 to 28

admit their “failure to control overeating”, and the basic principle of Overeaters Anonymous is “abstinence from overeating”. Members attended weekly meetings and were encouraged to have daily contact with their sponsor. YFAS scores and self-efficacy scores were both significantly lower among women attending the group for 1 year, but not among those attending the group for 5 years. Given that the study did not prospectively examine the same group of participants over time, conclusions could not be drawn regarding the changes in food addiction symptoms during treatment. It is possible that those who continue to struggle with food addiction are more likely to remain involved in Overeaters Anonymous over the long-term.

Vidmar et al. [35] conducted a pilot feasibility study examining an addiction-model abstinence-based mobile app for weight loss among a group of adolescents with obesity and food addiction ($N = 18$). The app focused sequentially on the elimination of “participant identified problem foods”, snacking, and overeating at meals. Participants were asked to weigh themselves daily and to weigh and record all foods consumed. The authors noted that the study was not designed to assess changes in YFAS scores, but did report that there was no significant linear relationship between baseline YFAS scores and weight change following the 6-month intervention. Participants in the mobile app group significantly reduced their weight ($M = 2.2$ kg), and their weight loss was comparable with a convenience sample of age-matched participants who had previously received a different treatment at the same program which did not incorporate addiction-based therapeutic targets and consisted of monthly clinic visits with a multidisciplinary team. However, it is noteworthy that participants

in the mobile app group received financial incentive (up to \$300) for participating and adhering to treatment, whereas the control group did not.

Interventions Among Individuals With Bulimia Nervosa

Hilker et al. [33] examined the impact of a psychoeducational group intervention among women with bulimia nervosa ($N = 66$), the majority of which (90.6%) exceeded the YFAS cutoff for food addiction. The intervention focused on reducing dieting, establishing a regular pattern of healthy eating, and recording their food intake. The prevalence and severity of food addiction reduced significantly following the 6-week intervention; however, there was no follow-up assessment to determine durability of improvement. Food addiction severity at baseline predicted some short-term treatment outcomes. Specifically, patients with higher food addiction severity at baseline were less likely to completely abstain from binge/purge episodes, but were not less likely to improve the frequency of their binge/purge episodes.

Interventions Among Individuals With Excess Weight

Mount et al. [30] recruited adults from an intensive weight loss program ($N = 74$) and randomized them to one of three groups during the weight maintenance phase: exposure and response prevention, stimulus control, or control. Participants in all groups were expected to exercise, record their food intake, and weigh themselves weekly. Participants in the exposure and response prevention group constructed a hierarchy of ten “difficult to resist” foods and were exposed to each of

Table 2 Study interventions and outcomes

Study	N	Design	Timing	Intervention	Format	Measures	Main results
1. Mount et al. [30]	Total = 74; completers = 68	RCT Control: weight maintenance intervention (TAU)	Assessment: pre-treatment, post-treatment Follow-up: 3-month post-treatment	Following an Optifast weight loss intervention phase, received exposure and response prevention (ERP) or stimulus control (SC) during weight maintenance phase; 1.5 h/session, 4×/week, for 14 sessions	Group; in-person	EOC; Weight	Group differences: ERP group reported greater reduction in FA (EOC scores). Participants high on EOC maintained weight loss significantly better with ERP training
2. Mason et al. [31]	Total = 88	RCT sub-study examining predictors of response to a weight loss intervention with or without mindfulness training Control: weight loss intervention	Assessment: pre-treatment Follow-up: 6-month post-treatment	Weight loss intervention plus mindfulness training; 16 sessions, 2–2.5 h/session and 1 full-day session over 5.5 months	Group and individual; in-person	YFAS; weight; BES; TFEQ; DEBQ; RED; MEQ	Group differences: Among participants with naltrexone-induced cortisol increases (i.e. greater opioid-mediated hedonic eating), mindfulness participants reported greater reductions in FA symptoms Group differences: FA and self-efficacy lower among participants attending the program for 1 year, but not 5 years
3. Weinstein et al. [32]	Total = 60	Cross-sectional study comparing 3 groups Control: no	Assessment: pre-treatment for participants beginning program mid-treatment for participants after 1 and 5 years in program	Compulsive Eating Anonymous self-help group; weekly 12-step group meetings plus daily contact with sponsor	Group; in-person	YFAS; self-efficacy; BDI; STAI; SSAI	
4. Hilkner et al. [33]	Total = 66; completers = 55	Uncontrolled study Control: no	Assessment: pre-treatment, post-treatment	Brief psychoeducational intervention; 90-min session, 1×/week, for 6 weeks	Group; in-person	YFAS; EDI-2; number of binge/purge episodes per week; SCL-90-R	FA severity and prevalence reduced post-treatment; FA severity was short-term predictor of abstinence from binge/purge episodes post-treatment
5. Sawamoto et al. [34]	Total = 119; completers = 86	RCT; also examined predictors of successful weight maintenance Control: weight maintenance intervention	Assessment: pre-treatment Follow-up: 12, 24-month post-treatment	Following a 7-month CBT weight loss intervention phase, received a 3-month CBT weight maintenance intervention with or without a program to increase exercise adherence; 40 group sessions (30 for phase 1 and 10 for phase 2, 90 min each) and 5 individual sessions	Group and individual; in-person	YFAS; weight; BES; TFEQ; CES-D; STAI	Group differences: larger weight reduction and lower FA and disinhibition at the end of weight loss intervention predicted successful weight loss maintenance; YFAS scores of successful participants at end of weight loss intervention were significantly lower than unsuccessful participants
6. Vidmar et al. [35]	Completers = 35	Pilot feasibility study Control: retrospective chart review of age-matched patients receiving weight management intervention (TAU)	Assessment: pre-treatment, mid-treatment (3 months), post-treatment (6 months)	Addiction-based weight loss mobile app with coaching; two, 45-min clinic visits, 2 min of text messaging 5 days/week (240 min total), weekly 15 min phone sessions (360 min total), ~ 11.5 contact hours per participant over 6-month intervention	Individual; smartphone app and in-person	YFAS-c; weight	Weight loss was comparable in app and control group; no significant relationship between YFAS-c scores at baseline and change in zBMI at 6 months; 17% of app participants had negative YFAS-c scores upon intervention completion
7. Webber et al. [36]	Total = 33; completers = 26	Pilot RCT Control: compared two active interventions	Assessment: pre-treatment,	Intuitive Eating program or Stress Reduction program; 75 min sessions, 2×/week, for 7 weeks;	Group; in-person for first 7 weeks	YFAS; weight; CES-D; PSS	Group differences: only the stress reduction group reported decreased FA symptoms at week 7 and

Table 2 (continued)

Study	N	Design	Timing	Intervention	Format	Measures	Main results
8. Miller-Matero et al. [37]	Total = 51; completers = 17	Uncontrolled pilot study Control: no	post-treatment (7 weeks) Follow-up: 14-week post-treatment Assessment: pre-treatment Follow-up: 1–2-year post-treatment	weeks 8–14 low-contact f/u period; sent weekly newsletters containing summaries of first 7 weeks Integrative therapy (cognitive, behavioural, acceptance and commitment, systems, and mindfulness) for weight management; 1-h session, 1×/week, for 6 weeks	Group; in-person	YFAS; weight; EES	decreased weight at week 7 and week 14 FA and weight decreased from pre-treatment to follow-up

FA, food addiction; *BDI*, Beck Depression Inventory; *BES*, Binge Eating Scale; *CES-D*, Center for Epidemiologic Studies Depression Scale; *DEBQ*, Dutch Eating Behavior Questionnaire; *EDI-2*, Eating Disorder Inventory 2; *EES*, Emotional Eating Scale; *EOC*, Eating Obsessive Compulsive Questionnaire; *MEQ*, Mindful Eating Questionnaire; *PSS*, Perceived Stress Scale; *RED*, Reward-Based Eating Drive; *SCL-90-R*, The Symptom Checklist Revised; *SSAI*, Spielberger State Anxiety Inventory; *STAI*, Spielberger Trait Anxiety Inventory; *TFEQ*, Three Factors Eating Questionnaire; *YFAS*, Yale Food Addiction Scale; *YFAS-c*, Yale Food Addiction Scale-children

these foods during treatment. Those in the stimulus control group were taught methods of avoidance, escape, and substitution of food cues. Those in the control group were taught to record their food intake and exercise, identify high-risk eating situations, and deal with relapse situations. This study was conducted prior to the publication of the YFAS, and the Eating Obsessive Compulsive (EOC) Questionnaire was used to assess compulsive eating. Participants in the exposure and response prevention group reported greater improvements in compulsive eating than those in the stimulus control group. Participants scoring high on the Eating Obsessive Compulsive Questionnaire maintained their weight loss significantly better with exposure and response prevention than stimulus control. On average, participants in the exposure and response prevention group maintained their weight loss whereas those in the stimulus control group regained 20% of the weight they had lost. The authors concluded that exposure and response prevention is superior to stimulus control in the treatment of compulsive eating.

Miller-Matero et al. [37] conducted a preliminary evaluation of an integrative psychological weight management group (“WAIT: Weight Assistance and Intervention Techniques” group) consisting of cognitive, behavioural, acceptance, and mindfulness techniques. Participants were encouraged to record their food intake, exercise, and weight, to engage in mindful eating, to challenge sabotaging thoughts, and to plan ahead for challenging eating situations. There is also an explicit focus on identifying and managing maladaptive eating behaviours (e.g. food addiction, binge eating) using cognitive and behavioural strategies. Participants attending the group ($N = 51$) were mailed a survey 1 to 2 years following completion of the group. YFAS scores and weight decreased significantly from the start of treatment to the follow-up period. However, the survey response rate (33%; $n = 17$) is a limitation of the study. In addition, participants were referred to this group from a bariatric surgery program and weight management program, and it is possible that they received additional weight or eating-related treatments that were not controlled for.

Webber et al. [36] conducted a pilot randomized controlled trial comparing two group-based “nondiet approaches to weight and health” among individuals with obesity recruited from the community ($N = 33$). The Emotional Brain Training group taught participants strategies to reduce stress and promote positive affect, such as compassion statements, stress-reducing statements, and the identification and expression of emotions. The Intuitive Eating group taught participants mindful awareness of signs of hunger and satiety. Some of the key principles of Intuitive Eating include rejecting the dieting mentality, honouring hunger, making peace with food, and coping with emotions without the use of food. Only completers in the Emotional Brain Training group ($n = 12$) reported significant improvements in YFAS symptoms and weight

from pre- to post-treatment (7 weeks later). The change in weight was maintained at the follow-up (14 weeks later), whereas the improvement in YFAS symptoms was not.

Sawamoto et al. [34] examined predictors of successful weight maintenance following a cognitive behavioural therapy (CBT) group for weight loss among women with overweight/obesity recruited from the community ($N = 119$). Participants were asked to reduce their food intake by 500 cal/day and record their intake on a food record, and to increase their physical activity (e.g. 8000 to 10,000 steps/day) and record their number of daily steps. They also received some training in stress management (e.g. cognitive restructuring, problem solving, assertiveness training). “Successful” weight loss was defined as losing more than 10% of the initial weight during the weight loss phase, and maintaining at least the 10% weight loss at the 1 and 2-year follow-ups. The authors did not include inferential statistics to assess whether the change in YFAS score from the beginning to end of the weight loss phase was statistically significant. Observation of the mean score suggests that food addiction symptoms did not improve in the total sample; however, the mean YFAS score was already low at baseline ($M = 2.1$, which is below the cutoff for food addiction). Lower YFAS score at the end of the weight loss phase was associated with successful weight maintenance at the 1-year follow-up and weakly associated with weight maintenance at the 2-year follow-up.

As part of a randomized controlled trial comparing the impact of a weight loss program with versus without an adjunct mindfulness-based intervention, Mason et al. [31] conducted a sub-study with women with obesity ($N = 88$) to assess whether cortisol and nausea responses induced by naltrexone (an opioidergic antagonist) correlated with measures of hedonic eating and predicted changes in these measures following the mindfulness intervention. Only 24% of participants in this study exceeded the YFAS cutoff for food addiction. The mindfulness training consisted of mindful awareness of food cravings, mindful consumption of favourite palatable foods, and identification of alternative responses to eating when not physically hungry. Among individuals with greater opioid-mediated hedonic eating, those receiving the adjunct mindfulness training (vs. standard weight loss treatment) reported greater reductions in YFAS scores and a trend for greater weight loss. The authors concluded that the success of individuals with opioid-mediated hedonic eating in standard weight loss treatment may be strengthened by the addition of mindfulness training targeting hedonic eating.

Discussion

This systematic review examined the current state of the empirical literature on psychosocial interventions for food addiction. The results indicate that there are currently no

psychosocial interventions for food addiction that satisfy the criteria to be considered an empirically supported treatment [38, 39], defined as a “clearly specified psychological treatment shown to be efficacious in controlled research with a delineated population” (p. 7) [38]. Given the dearth of literature on this topic, the inclusion criteria in the current review were broad and included both interventions delivered to individuals with food addiction that explicitly targeted food addiction symptoms [32, 35], and interventions that did not explicitly recruit individuals with food addiction or target food addiction symptoms, but rather assessed food addiction symptoms as an outcome in the context of a psychosocial intervention for bulimia nervosa [33] or excess weight [30, 31, 34, 36, 37]. This latter group of studies included a psychoeducation group emphasizing normalized eating and self-monitoring [33], an exposure and response prevention group and stimulus control group [30], an integrative group (CBT, acceptance, mindfulness) [37], an “Emotional Brain Training” (stress reduction) group and Intuitive Eating group employing mindfulness strategies [36], a CBT group for weight loss [34], and a mindfulness-based group for weight loss [31].

Methodological limitations of the studies included in the review (see the “Limitations” section below) limit the conclusions that can be drawn; however, a few of the interventions demonstrated some promise for short-term improvement of food addiction symptoms. Specifically, women with bulimia nervosa (90% of whom had food addiction) reported improvements in food addiction symptoms following a brief psychoeducation intervention emphasizing normalized eating and recording food intake [33]. Individuals with excess weight reported improvements in food addiction symptoms following exposure and response prevention [30], integrative therapy [37], stress reduction training [36], and mindfulness training [31], and in some cases, improvements in weight as well [30, 37]. Considering the controversy regarding the treatment implications of food addiction, it is noteworthy that no studies have directly compared the efficacy of an abstinence-based versus moderation approach to treating food addiction among individuals who exceed the YFAS cutoff for food addiction. The study by Mount et al. [30] suggested that exposure and response prevention (i.e. exposure to triggering foods) may be a superior approach to stimulus control (i.e. avoidance of food cues) in improving food addiction and maintaining weight loss among individuals with obesity; however, this finding requires replication using a more rigorous study methodology.

Food addiction is reported more frequently, though not exclusively, among individuals with obesity and those with disordered eating [8–11]. Despite the argument that food addiction is distinct from obesity and binge eating disorder [40], it is noteworthy that the majority of psychosocial interventions identified in this review were weight loss interventions for individuals with excess weight that assessed food addiction as a secondary outcome and/or as a predictor of weight loss

outcome. In the treatment of binge eating disorder, which is highly comorbid with food addiction [41, 42], best practice clinical guidelines recommended that binge eating symptoms be targeted first before an explicit focus on weight loss [14]. It will be important for future research to evaluate whether this recommendation should also apply to food addiction symptoms.

Limitations

The findings of the current review need to be considered in light of a number of significant limitations that impact the conclusions that can be drawn. These limitations are reflected in the study quality ratings according to an established checklist [25], which correspond to “poor” (< 14) or “fair” (15 to 19) study quality [28]. Many of these limitations may be attributed to the early state of this research—several of the studies were described by the authors as preliminary, pilot, and feasibility studies [35–37]. First, the majority of the studies had very small sample sizes and thus were likely insufficiently powered to test the impact of the interventions on food addiction, and data analyses were performed using only treatment completers. Second, several studies either lacked a control group [33, 37] or included a control group that introduced a number of confounding factors [35], so improvements cannot necessarily be attributed to the intervention. Third, the follow-up assessment periods were either absent or very brief. Finally, treatment adherence was not assessed.

Recommendations for Research and Clinical Practice

Research

Although the body of empirical literature on psychosocial interventions for food addiction is still quite small, it is promising that 7 of the 8 (87.5%) studies included in the current review were published within the past 5 years suggesting a growing interest in this topic. As a starting point, it is recommended that programs that currently provide treatment for food addiction conduct qualitative interviews with patients to inquire about their treatment experiences, administer validated measures (such as the YFAS [5], Binge Eating Scale [43], and Loss of Control Over Eating Scale [44]) at pre-treatment, post-treatment, and longer-term follow-up, and evaluate and disseminate the clinical outcomes.

Much controversy exists regarding whether abstinence-based versus moderation approaches should be recommended in the treatment of food addiction, and this important empirical question remains to be tested. Similar controversies have existed regarding the treatment recommendations for alcohol addiction [45, 46]. A randomized controlled trial directly comparing an abstinence-based intervention (e.g. an intervention based on a 12-step program that promotes abstinence from

“addictive” foods) to a moderation approach (e.g. an intervention such as CBT and/or mindful eating that encourages consumption of all foods in moderation) among individuals who exceed the YFAS cutoff for food addiction is warranted to inform this debate. One of the challenges in conducting such research is that the treatment recommendations regarding the consumption of “addictive” foods are diametrically opposed [17], and advocates of each approach are concerned that the other approach will worsen eating pathology (e.g. increase preoccupation with food and binge eating). This too is an empirical question that can be tested. Given that patient characteristics are one of the pillars of evidence-based practice, along with clinical expertise and research evidence [47, 48], it is recommended that qualitative research be conducted with individuals with food addiction to learn about their treatment preferences. Presumably a “one size fits all approach” will not meet the needs of all individuals with food addiction, and it will be important for future research to examine moderators of treatment outcome, such as YFAS severity, comorbid eating disorder or substance-related disorder diagnoses, and weight status.

Only two interventions included in the current review explicitly targeted food addiction symptoms, both of which were abstinence-based interventions [32, 35]. There are a number of evidence-based treatments for addictions [13] that have also demonstrated benefits in the treatment of binge eating [16, 21], such as motivational interviewing [49, 50] and CBT [14], and we are unaware of any empirical research that has examined the efficacy of these interventions specifically for food addiction. Treasure et al. [18••] and Wiss and Brewerton [19••] recently proposed some recommendations for incorporating the concept of food addiction into evidence-based treatments for eating disorders, and these treatment adaptations await empirical investigation.

Clinical Practice

At the present time, there are no empirically supported treatments for food addiction. As part of the informed consent process, clinicians treating individuals with food addiction should make them aware of the current status of the treatment literature, provide the rationale for their treatment recommendations, and discuss the experimental nature of the treatment.

Given the strong relationship between food addiction and eating disorders [8–11, 41, 42], we recommend that clinicians assess for eating disorders, and if present, provide an evidence-based treatment, such as cognitive behavioural therapy for bulimia nervosa or binge eating disorder [14]. Cognitive behavioural therapy does not promote abstinence from any specific foods; yet, recent meta-analytic reviews reported that 50% of individuals with binge eating disorder receiving CBT (presumably the majority of which would have also endorsed food addiction) achieve abstinence from binge

eating [51, 52]. Further, we recommend administering the YFAS as an outcome measure along with validated measures of disordered eating to assess whether food addiction symptoms improve in response to evidence-based treatments for bulimia nervosa and binge eating disorder. It would be informative for future research to examine whether the adapted treatments for disordered eating proposed by Treasure et al. [18••] and Wiss and Brewerton [19••] that incorporate the addictions concept improve outcomes relative to the existing evidence-based treatments for binge eating.

Conclusions

Controversy surrounds both the validity and clinical utility of food addiction. The body of empirical research examining its clinical utility is far less developed, which is somewhat surprising given the substantial history of food addiction [6] and the number of people who report experiencing food addiction symptoms along with distress/impairment. At the present time, there are no empirically supported psychosocial interventions for food addiction. Additional research is warranted to develop and test the efficacy of interventions for food addiction. In the meantime, we recommend that clinicians treating food addiction assess for comorbid eating disorders, and if present, first provide evidence-based treatments for those conditions (or refer to another health care professional with relevant clinical expertise) and assess the impact on food addiction symptoms.

Compliance With Ethical Standards

Conflict of Interest The authors declare that they have no conflict of interest.

Human and Animal Rights and Informed Consent This article does not contain any studies with human or animal subjects performed by any of the authors.

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Papers of particular interest, published recently, have been highlighted as:

- Of importance
- Of major importance

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