

A scoping review of lifestyle and behavioral treatment approaches for binge eating disorder

by

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Abstract

Binge eating disorder (BED) significantly impacts quality of life. The Diagnostic and Statistical Manual of Mental Disorders, 5th ed. (DSM-V) published May 18, 2013, was revised to include BED as a distinct diagnosis. The aim of this review was to map the research on lifestyle and behavioral treatments for BED since the diagnostic change. Population characteristics were assessed to evaluate features within studies and whether disparities exist.

Three databases (PubMed, PsycInfo, and Scopus) were searched for relevant articles. Eleven studies were identified for review. Four studies were pilot/proof of concept (POC) studies, five included some form of self-help intervention strategy, and two were group therapies.

Studies included new treatment approaches and adaptations for wider dissemination. Only one study investigated a multidisciplinary approach and one on stepped care. Studies indicated that compassion-based therapies are promising for treating BED. All self-help therapies significantly reduced binge eating frequency. Self-help treatments were based on Cognitive Behavioral Therapy (CBT), Dialectical Behavioral Therapy (DBT), and self-esteem focused CBT. Integrative Cognitive-Affective Therapy (ICAT BED) was found to be comparable to guided self-help CBT. There is limited support for group treatment focused on associated BED factors (impulsivity, negative affect, and low activation).

Lack of diversity in participants continue to be an issue with majority female Caucasian participants. Inconsistency found between studies in types of demographics reported and how each was measured. Outcome measures and exclusion criteria between studies varied widely. None of the studies reviewed used the added severity rating in the DSM-V criteria in participant selection.

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List of Abbreviations

AUDIT-C: Alcohol Use Disorders Identification Test
BA: Behavioral Activation
BADs: Behavioral Activation in Depression Scale
BDI: Beck Depression Inventory
BDI-FS: Beck Depression Inventory Fast Screening
BE: Binge Eating
BED: Binge Eating Disorder
BES: Binge Eating Scale
BIAAQ: Body Image Acceptance and Action Questionnaire
BIS-15: Barrat Impulsiveness Scale-Short Version
BIS/BAS: Behavioral Inhibition System/Behavioral Activation System questionnaire
BISS: Body Image Shame Scale
BMI: Body Mass Index
BSI: Brief Symptom Inventory
CAAS: Compassion Attributes and Actions Scales
CARE: Compassionate Attention and Regulation of Eating Behavior
CBT: Cognitive Behavioral Therapy
CBT-GSH/GSH: Guided Self-Help Cognitive Behavior Therapy
CBTsh: Cognitive Behavioral Therapy (self-help)
CEQ: Credibility/Expectancy Questionnaire
CES-D: Center for Epidemiological Studies for Depression
CFQ-FC: Cognitive Fusion Questionnaire - Food Craving
CFTsh: Compassion Focused Therapy (self-help)
CIA: Clinical Impairment Assessment
CS: Computerized Selves
CSQ: Client Satisfaction Questionnaire
DASS21: Depression, Anxiety, and Stress Scale
DBT-GSH: Dialectical Behavior Therapy Guided Self-Help
DBT-USH: Dialectical Behavior Therapy Unguided Self-Help

DEBQ: Dutch Eating Behavior Questionnaire
DERS: Difficulties in Emotion Regulation Scale
EAT: Eating Attitude Test
ECR: Experiences in Close Relationships scale
ED: Eating disorder
EDE: Eating Disorder Examination
EDE-Q: Eating Disorder Examination Questionnaire
EDNOS: Eating Disorder not Otherwise Specified
EOT: End of Treatment
EROS: Environmental Reward Observation Scale
EMA: Ecological Momentary Assessment
F2F: Face-to-Face
FCQ-S-r: Food Craving Questionnaire State-reduced
FCQ-T: Food Craving Questionnaire Trait
FFMQ: Five Facet Mindfulness Questionnaire
FSC: Fears of Compassion Scale
FSCRS: Forms of Self-Criticism and Self-Reassurance Scale
GPIP: Group Psychodynamic-Interpersonal Psychotherapy
HADS: Hospital Anxiety and Depression Scale
HRS: Homework Rating Scale
HR-QOL-SF6D: Health-Related Quality of Life-Short Form 6D
ICAT-BED: Integrative Cognitive Affective Therapy
IIP64: Inventory of Interpersonal Problems
IWQOL: Impact of Weight on Quality of Life
LMHC: Licensed Mental Health Counselor
LOC: Loss of Control
Mini-DIPS: Diagnostic Interview for Mental Disorders (Short Version)
OBE-F: Objective Binge Eating Frequency
PANAS: Positive and Negative Affect Scale
POMS: Profile of Mood States
QOL: Quality of Life

RDN: Registered Dietitian Nutritionist
ReTAINE: Real Time Assessment in the Natural Environment (system administered by smart phone)
RSEQ: Rosenberg Self-Esteem Questionnaire
SASB-SF: Structural Analysis of Social Behavior Intrex Questionnaire, Short Form
SAS-M: Modified Social Adjustment Scale
SCID: Structured Clinical Interview
SCL: Symptom Checklist
SCS: Self-Compassion Scale
SE-USH: Self-Esteem Unguided Self-Help
SES: Socioeconomic Status
STAI: State-Trait Anxiety Inventory
TFEQ: Three-Factor Eating Questionnaire
TRIPED: Tape Rating Instrument for Psychotherapy of Eating Disorders
TSPE: Treatment Suitability and Patient Expectation
UPPS-R: Impulsivity Scale
USH: Unguided Self-Help
VC: Videoconferencing
WBQ: Weekly Binges Questionnaire
WSAS: Work and Social Adjustment Scale
YFAS: Yale Food Addiction Scale

Chapter 1 - Introduction

Eating disorders (ED) are serious illnesses that have a wide range of consequences.

Binge eating disorder (BED) is the newest eating disorder to gain a distinct classification in the Diagnostic and Statistical Manual of Mental Disorders, 5th ed. (DSM-V). Previously, BED was included in the DSM-IV-TR as being provided for further study and listed under Eating Disorder not Otherwise Specified (EDNOS) (Amianto et al., 2015). Diagnostic criteria changed from having a binge eating episode ≥ 2 days per week for ≥ 6 months, to at least once a week for ≥ 3 months. Another change in the DSM-V criteria was the inclusion of a severity specifier (Grilo et al., 2015). The binge episodes are characterized by consumption of an unusually large amount of food in a period of time, with a sense of loss of control and without compensatory behavior, and followed by distress regarding binge eating (Cossrow et al., 2016).

Prior to publication of the DSM-V, studies found lifetime prevalence of BED to range from 0.2% to 4.7% using DSM-IV-TR criteria. Cossrow et al. (2016) assessed survey data of a large (n=22,397) representative sample of U.S. adults to compare prevalence rates using DSM-IV-TR and DSM-V criteria. DSM-V estimates resulted in higher lifetime prevalence rates than DSM-IV-TR, at 2.0% and 1.5%, respectively. In women prevalence estimates changed from 1.5 to 2% and from 0.8 to 1.2% in men (Cossrow et al., 2016). The diagnostic criteria effect on prevalence rate makes it difficult to assess the proportion of actual increases in prevalence versus affects from changes in diagnostic criteria.

Socioeconomic status (SES), education, racial/ethnic minorities, and sex have been minimally investigated in relation to BED. A systematic review of socioeconomic status and ED's found no differences in SES and education between BED and non-BED groups (Huryk et al., 2021). Males and ethnic/racial minorities (Hispanic and non-Hispanic Black) are

significantly less likely to seek help compared to non-Hispanic white females (Coffino et al., 2019) and have been underrepresented in BED clinical trials (Lydecker et al., 2020; Thompson-Brenner et al., 2013). Racial/ethnic minority and lower SES groups are actually overrepresented in the BED general population (Thompson-Brenner et al., 2013). Aggregated data from randomized controlled trials (RCT) showed that sex is not a significant moderator and treatment outcomes for males are comparable or better than females (Lydecker et al., 2020). Analyses of aggregated data on race/ethnicity did not show large effects on BED symptoms but there were significantly higher dropout rates in Black participants, followed by Hispanic, then White. Lower educational attainment is associated with significantly lesser treatment effects. Although there have been significant findings, due to the underrepresentation of racial/ethnic minorities and lower educational attainment, the adequacy of available data is questionable (Thompson-Brenner et al., 2013). It should be noted that the data on racial/ethnic minorities did not include other racial/ethnic minorities, and only categorized participants into three categories (White, Black, and Hispanic).

There are many common psychiatric and somatic comorbidities with BED. Within the BED population, over 80% of those who seek treatment have a comorbid mental disorder (Tasca et al., 2019). Those with BED report more psychiatric comorbidities than non-BED, and also report lower self-esteem (Cossrow et al., 2016). BED is a common mental disorder within the populations that are overweight or obese “With prevalence rates up to 30-40%” (Wyssen et al., 2021, p. 938). Some psychiatric comorbidities include depression, anxiety, personality disorders, and substance abuse. Possible psychiatric symptoms are difficulties with emotional awareness and regulation, significant interpersonal problems, disinhibition and anger, impulsivity, functional impairment and depressed mood and negative feelings (Amianto et al., 2015). Other

health problems associated with BED are diabetes, insomnia, disability, and mental, social, and physical impairment. These compounding factors have a negative effect on overall quality of life and increase healthcare utilization (Amianto et al., 2015; Johnson et al., 2001). Although psychiatric disorders are commonly associated with BED, there is not adequate evidence to support identification of ED risk factors other than with regard to early traumatic and stressful events (Solmi et al., 2021).

Psychological interventions are often the first line treatment approaches for BED treatment. Cognitive behavioral therapy (CBT), which focuses on BED etiology, is the most studied and supported treatment modality, often adapted from existing treatments for bulimia nervosa. CBT alone has resulted in approximately 50–60% remission rate, with long term improvement in quality of life, gradual normalization of eating patterns, reduced relapse, and improved disinhibition, negative feelings, hunger, and perceived overall health (Amianto et al., 2015).

The interpersonal therapy (IPT) treatment approach for BED assumes that interpersonal and social contexts are central to an individual's mental health. This approach targets the interpersonal impairment that may play a role in maintaining an ED. IPT is a short-term intervention that addresses the interpersonal model of binge eating, where interpersonal problems lead to both negative affect and binge eating and other eating disorder behaviors. There is strong evidence supporting IPT efficacy in treating BED (Amianto et al., 2015; Karam et al., 2019), and CBT and IPT seem to have comparable effectiveness in reducing binge eating and psychiatric comorbidities (Amianto et al., 2015).

Self-help forms of CBT provide printed manuals that are self-managed or guided self-help (GSH). These treatments are effective and cost-effective alternatives to higher intensity

CBT and IPT treatments. Individual CBT and IPT are costly, time intensive, and require specialists, which may not be necessary for less severe cases (Amianto et al., 2015; Traviss-Turner et al., 2017). Self-help is recommended in the United Kingdom as the first step in a stepped care approach. If deemed necessary, patients would receive a more intensive treatment such as enhanced CBT. For mild to moderate cases of eating disorders, guided self-help has been recommended and has been shown to be efficacious for addressing binge eating. (Traviss-Turner et al., 2017). CBT self-help has been shown to be more effective than diet and lifestyle interventions and does not have contraindications (Amianto et al., 2015). Guided self-help involves support sessions with trained professionals while self-management involves independent study and activities. In comparing self-management versus GSH, a Cochrane review concluded that GSH is superior to self-management (Traviss-Turner et al., 2017).

The newest category of psychiatric treatments has been referred to as “Third wave” CBT treatments. Instead of targeting cognitive processes, third wave treatments target awareness with additional focus on acceptance, mindfulness, metacognition, psychological flexibility and reduction of experiential avoidance. There is general consensus that the following fall within this category: dialectical behavioral therapy (DBT), acceptance and commitment therapy, compassion focused therapy (CFT), mindfulness-based interventions, functional analytical therapy, schema therapy, and metacognitive therapy (Linardon et al., 2017). DBT is the most widely studied in this category and evidence supports DBT as possibly effective for in reducing binge eating at rates comparable to CBT (Amianto et al., 2015).

Other relevant approaches for BED treatment include multidisciplinary and diet and lifestyle interventions. The evidence for multidisciplinary approaches is weak and stepped approaches seem more appropriate with treatments tailored to disease severity. These approaches

may be of interest in addressing weight loss since CBT does not focus on weight loss, and excess weight is associated with impairment, comorbidities, and low quality of life. There is evidence to support some effectiveness with diet and lifestyle interventions, but remission rates tend to be lower than in psychotherapies. Diet and lifestyle intervention may require close supervision due to the compromised health of BED patients. (Amianto et al., 2015).

There is substantial evidence that dates back to well before the diagnostic and criteria change for BED, that support CBT and GSH as effective treatment approaches. The aim of this scoping review was to investigate the landscape of research on lifestyle and behavioral treatments for BED after BED was changed in the DSM V as a distinct diagnosis. Additional focus was placed on demographics to assess possible disparities in population representation.

Chapter 2 - Methods

2.1 Search Strategy

The initial search began on January 22, 2022, and was completed on February 4, 2022.

Databases searched were PubMed, PsycInfo, and Scopus. Key MeSH terminology used to search PubMed was “Binge eating disorder” with subheadings psychology, diet therapy, rehabilitation, and therapy. The search was filtered to only include randomized controlled trials (RCT) because it is the most rigorous study design and provides the best quality evidence with the least risk of bias. Terminology used to search both PsycInfo and Scopus included “binge eating disorder, treatment, and randomized controlled trials.” All three databases were filtered for publications after March 18, 2013. This date was used because it was based on the DSM-V publication date.

2.2 Eligibility Criteria

Inclusion criteria consisted of randomized controlled trials with participants who were diagnosable for BED according to DSM-V criteria and with treatment based on a lifestyle and/or behavioral intervention. Use of DSM-V criteria eliminates research that uses the International Classification of Diseases (ICD) which allows for more clinical discretion than does the DSM (Tyrer, 2014). Use of DSM criteria reduces participant characteristic variances due to differences from clinical discretion. Lifestyle and/or behavioral interventions comprised diet, exercise, and psychological treatments. Exclusion criteria were drug therapies, participant diagnoses based on DSM-IV criteria, treatment of binge eating behavior only, and inclusion of participants diagnosed with eating disorders other than BED. Studies that included participants with other diagnosable eating disorders such as anorexia nervosa and bulimia nervosa were excluded due to the inability to separate outcome data of participants with BED from those with other ED's.

2.3 Screening and Elimination

Screening and elimination of studies was conducted via a two-step process. Step one included the initial brief screening of articles based on title and abstract relevance. Relevant records were imported into Zotero research tool for management and categorization. Next, the use of DSM-V diagnostic criteria was searched within the text of each article, followed by elimination based on all other inclusion and exclusion criteria.

2.4 Data Extraction and Summary

Full text review of articles included specific data extraction. This included publication year, country of study, objective, treatment group(s), intervention duration, recruitment strategies, number of participants, percentage of female participants, age criteria used for the study, mean age (SD) of participants, Body Mass Index (BMI) criteria, mean BMI (SD), other included demographics, measures used, main results, and conclusions. All information listed above was incorporated into a summary table. Categorization was completed based on common study features and separated accordingly. Demographic data collected, races indicated, and exclusion criteria were summarized in separate tables to display overall participant's general characteristics.

A measurement tool table was created to provide brief explanations of each tool. Descriptions of the tools were extracted from included studies. If a description was not available, details were found from other sources. The number of studies that used each tool was tallied and noted in the table. Measures were categorized based on the outcome of interest measured.

Chapter 3 - Results

The database searches resulted in a total of 605 results (130 from PubMed, 174 from PsycInfo, and 301 from Scopus). Following removal of duplicates and initial screening of titles and abstracts of RCTs on lifestyle and behavioral treatments for BED resulted in 41 studies. After further evaluation based on the inclusion and exclusion criteria, 18 were excluded that did not solely include participants diagnosed based on DSM-V criteria and 12 studies were excluded because of inclusion of other eating disorder types. This resulted in 11 studies that met all eligibility criteria for review.

The years of publication ranged from 2015 to 2021 and the studies were based in the U.S.A, Canada, Portugal, Germany, Switzerland, and Sweden. The eleven studies were split into three categories based on major characteristics: pilot/proof of concept (POC), inclusion of self-help, and miscellaneous group interventions. There were four (36%) pilot/POC studies, five (45%) that include self-help interventions and two (18%) in the miscellaneous group category. The miscellaneous group interventions were based on behavioral activation and impulsivity focused approaches. The duration of studies ranged from two weeks to six months.

3.1 Demographics, Exclusion Criteria, and Study Measures

Participants were recruited through a variety of avenues that included referrals and advertisements. One study (Alfonsson et al., 2015) only recruited through referrals from an obesity clinic and all others recruited from the general population with advertisements in various types of media, local establishments, clinics, hospitals, and/or universities. The number of participants ranged from 18 to 135. Six of 11 studies included a BMI criterion with mean (SD) BMI ranging from 29.4kg/m² (7.2) to 41.17kg/m² (5.32). Two had criteria that included only overweight or obese participants. Seven of 11 studies indicated age criteria with mean (SD) age

ranging from 27.0y (8.9) to 45y (12.0). All studies were either majority female (>82%) or 100% female with seven that included males. Additional demographic information recorded included: race, education, relationship/marital status, socioeconomic status, employment/professional status, children, and income (Table 3.1). There was inconsistency in how each type was measured (e.g., education measured by years in one study but measured by type of degree earned in another). Specific race information was only provided in three studies (Table 3.2). The studies all noted that there were no significant differences between groups according to demographic information collected. Overall types of demographic data were varied and were not consistent between studies.

Table 3. 1 Other Demographic Data

	Number (n = 11)	Percentage (%)
Education	9	82%
Relationship/marital status	7	64%
Socioeconomic status	2	18%
Employment/professional Status	4	36%
Children	2	18%
Income	2	18%

Counted if any information was included in the category

Table 3. 2 Race or Ethnicity Details

	Number (n = 11)	Percentage (%)
None indicated	2	18%
Provided Caucasian % Only (Majority	5	45%
Other races included	2	18%
Provided nationality only	2	18%

Table 3. 3 Exclusion Criteria

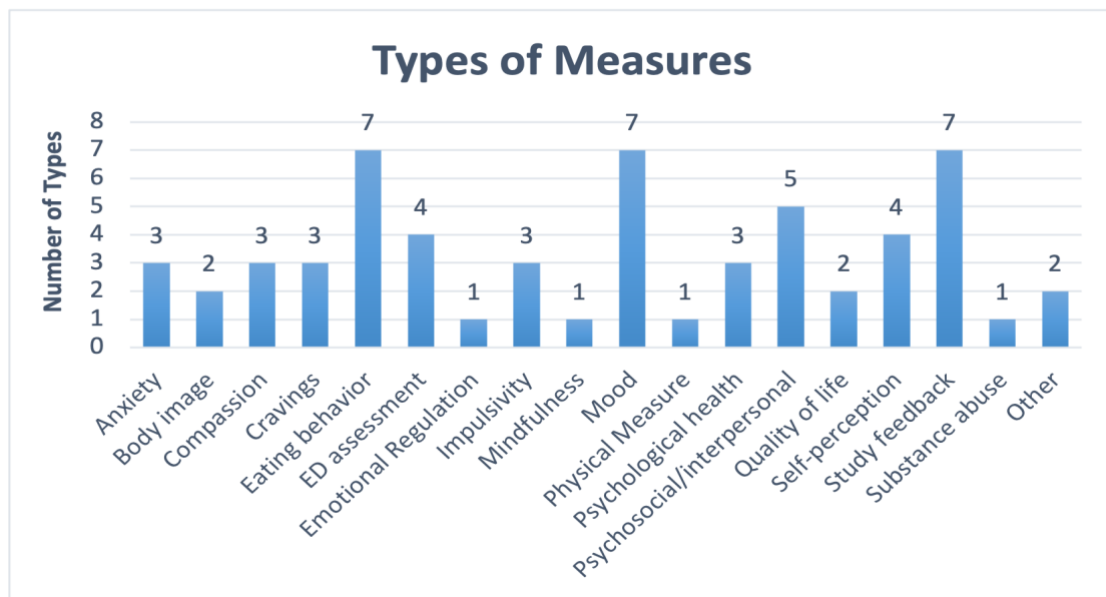
	Number (n-11)	Percentage (%)
Current BED treatment or weight-loss intervention	7	64%
Current psychotherapy	2	18%
Pregnancy and/or lactation	10	91%
Severe medical problem/uncontrolled disease	4	36%

Substance related disorder	8	73%
Severe mental disorder (e.g., bipolar disorder, major depression, schizophrenia, psychosis)	8	73%
Suicidality	4	36%
Medical condition and/or medication affecting appetite control and weight	7	64%
Insufficient language proficiency	5	45%
Vision impairment	1	9%
Previous bariatric surgery	2	18%
Intake of psychotropic medication	2	18%
Bulimia Nervosa/Purging behavior	2	18%
Cognitive impairment	2	18%

Detailed exclusion criteria summary in Appendix (Table A.1)

Participant exclusion criteria were inconsistent between studies. Most excluded those who were pregnant, were currently receiving treatment for BED, had a substance-related disorder, comorbid severe mental disorder, and any medical condition or medication that may affect appetite and/or weight. There were 14 different exclusion criteria not related to BMI or age.

Figure 3. 1 Types of Measures



There were 56 different measurement tools used in the 11 studies. A measurement tool reference table is included in Table A.2. A total of 18 types were established: ED assessment, substance abuse, body image, impulsivity, eating behavior, mood, anxiety, compassion, mindfulness, cravings, self-perception, emotional regulation, quality of life, psychological health, psychosocial/interpersonal, physical measure (anthropometrics), study feedback or other. The other category included help-seeking and environmental reward observation scale (EROS). The most variety of tools used were to measure mood, eating behavior, and general study feedback. The Eating Disorder Examination (EDE) and/or EDE Questionnaire (EDE-Q) were used in all studies.

Table 3. 4 Measures

Author	Country	Measures
PILOT/POC		
Kelly and Carter 2015	Canada	BMI, EDE-Q, OBE-F, SCS, CES-D, FCS, CEQ, HRS
Duarte et al., 2017	Portugal	BMI, EDE, BES, BISS, DASS21, CFQ-FC, BIAAQ, FFMQ, CAAS, SCS, FSCRS, Custom study feedback
Giel et al., 2017	Germany	SCID-IV, EDE-Q, FCQ-S-r, YFAS, Berridge, Custom study feedback
Yu et al., 2021	USA	EDE-Q, EAT, TFEQ, YFAS, SCL-90R, BDI-II, IWQOL-Lite (short form), Custom study feedback
SELF HELP		
Cachelin et al., 2019	USA	EDE, BDI-II, BSI, CSQ, help-seeking, BMI
Tasca et al., 2019	Canada	SCID-IV, EDE, EDE-Q, CES-D, IIP64, ECR, TRIPED,
Peterson et al., 2020	USA	EDE, SCID-IV, CIA, BDI, STAI, AUDIT-C, DERS, UPPS-R, SASB-SF, RSEQ, CS, TSPE, BMI, EMA-ReTAINE system (incl. PANAS, POMS, & ratings of overeating, LOC, and BE)
Carter et al., 2020	Canada	EDE, EDE-Q, BSI, HR-QOL-SF6D, custom study feedback

Wyssen et al., 2021	Switzerland	Mini-DIPS, BMI, WSAS, EDE-Q, BDI-FS, WBQ, Custom study feedback
Miscellaneous Group		
Alfonsson et al., 2015	Sweden	BMI, EDE, EDE-Q, HADS, SAS-M, EROS, BADS
Schag et al., 2019	Germany	EDE, BMI, EDE-Q, DEBQ YFAS, FCQ-T, short version, BIS-15, BIS/BAS, BDI

Measurement tool glossary in Appendix, Table A.2

3.2 Pilot/POC Studies

There were three pilot studies and one proof of concept study. The intervention strategies included were self-help compassion-focused therapy (CFTsh) compared to CBTsh, compassionate attention and regulation of eating behavior – self-help (CARE), inhibitory training, and videoconferencing (VC) based treatment. Study duration ranged from 2 to 12 weeks. Participant ages ranged from 18y to 41y. All 4 studies were based in separate countries (Canada, Portugal, Germany, and U.S.A.).

Compassion-Based Treatment

Two of 4 studies were self-help interventions that incorporated self-compassion. The CFTsh vs. CBTsh study consisted of two components. The first component for both groups and second component for CBTsh group was based on portions of a self-help book titled *Overcoming Binge Eating* by Christopher G. Fairburn (1995) that provide step-by-step guidelines. The first component was based on step 2 the Fairburn text and involved education on regular, balanced, and planned eating and participants were encouraged to follow a structured eating plan. The second component differed in how participants handled binge urges. The CBTsh group was given instructions on how to list and use alternative activities to replace binge eating when urges arise. This was derived from step 3 in the Fairburn (1995) text. The CFTsh group was educated on self-compassion, given two imagery exercises, and encouraged to use self-compassion

development tools. They were instructed to use compassionate imagery, self-talk, acceptance and care for distress, and commitment to a self-compassionate course of action when binge eating urges arise (Kelly & Carter, 2015).

CARE is the other intervention that incorporated self-compassion. This intervention began with an educational presentation on eating regulation, emotional regulation, the binge eating cycle, and how mindfulness and compassion may help manage binge eating impulses. During the presentation participants were shown mindfulness meditation and compassionate imagery exercises. The participants were then given a program support manual for the 4-week self-help program. The self-help portion included mindfulness practices related to presence, body, and eating, compassionate imagery to build self-compassion, and adoption of daily informal practices in awareness and compassion (Duarte et al., 2017).

Results for both CFTsh and CARE provided preliminary evidence supporting compassion-based self-help treatments for BED. The CBTsh group also had positive results with reduction in binge eating frequency. With the inclusion of the Fears Compassion Scale (FSC) in Kelly & Carter's (2015) study, results showed that only participants with low fear of compassion in the CFTsh group had significant decreases in eating disorder pathology. Both compassion-based interventions significantly decreased binge eating symptoms and improved psychological well-being.

Inhibitory Training and Videoconferencing-Based Treatment

The inhibitory training study was the only proof of concept trial included. It tested a behavioral intervention for increasing inhibitory control. Participants were shown pictures of high-caloric food items in their peripheral vision on a computer screen. The inhibitory group was instructed to suppress the urge to turn their gaze toward the pictures. The control group could freely explore.

Three sessions were conducted over 2 weeks. Both groups reported significantly lower binge eating episodes 4 weeks after training and high satisfaction with the training. The authors concluded that this approach is feasible and acceptable but larger studies are required (Giel et al., 2017).

The final pilot study was one that compared videoconferencing (VC) based treatment with face to face (F2F) treatment. Treatment for both groups consisted of 12 sessions, alternating between a Licensed Mental Health Counselor (LMHC) and Registered Dietitian Nutritionist (RDN). LMHC sessions used “CBT principles and lessons on motivation, binge triggers, automatic thoughts, cognitive restructuring, stress and problem-solving, and assertiveness.” RDN sessions focused on “daily self-monitoring, meal planning, physical activity, mindful eating, exposure to high-risk foods, and relapse prevention strategies” (Yu et al., 2021, p. 331). The F2F group met in person and VC via a HIPAA compliant telehealth software. Both groups did not achieve any significant changes in weight and binge eating episodes. The F2F group significantly improved in eating behavior, food addiction diagnosis, and clinical significance. The VC group significantly improved in EDE shape concern and global score. It was concluded that VC multidisciplinary treatment is feasible and possibly effective but needs large scale efficacy trials (Yu et al., 2021).

Table 3. 5 Pilot/POC Studies Summary

Author	Country	Treatment Group(s)	Duration	n	Result	Conclusion
Kelly and Carter 2015	Canada	CFTsh vs. CBTsh vs waitlist control	3 weeks	41	No differences between groups for compliance, credibility, and expectancy. Both interventions resulted in higher reductions in weekly binge days than waitlist control. CFT reduced global eating disorder pathology, eating concerns, and weight concerns and increased self-compassion more than other 2 groups. Only those low in fear of self-compassion in CFT had significant EDE-Q and depressive symptom decreases. Self-compassion only increased in CFT group.	Structured food plans combined with either CBTsh or CFTsh can improve OBE-F. CFTsh may be more effective in treating underlying psychological vulnerability. This study provides preliminary support for CFT-based intervention as an adjunct treatment for BED. It is important to have low FSC scores to maximize benefit from CFTsh.
Duarte et al., 2017	Portugal	CARE vs waitlist control	4 weeks	20	CARE resulted in significant increases in awareness, self-assurance, compassionate actions, and body image-related psychological flexibility; reductions in eating psychopathology symptoms, body image shame, binge eating symptoms, self-criticism, and indicators of psychological distress.	CARE may improve eating behavior and psychological wellbeing in individuals with BED. The study provides preliminary evidence supporting CARE's effectiveness.
Giel et al., 2017	Germany	Inhibitory training vs. control	2 weeks	22	Both groups reported significantly lower binge eating episodes 4 weeks after training. No changes in food craving, food addiction, liking, and wanting ratings. Participants in both groups reported high satisfaction with the training, willing to recommend the training, and willing to participate again.	Food specific inhibition training is feasible and acceptable. It may be useful in ED treatment. Larger studies needed.
Yu et al., 2021	USA	VC-based vs. Face-to-face (F2F)	12 weeks	18	No changes in weight and binge eating episodes were observed in either group with no difference between groups. F2F finishers had significant improvement in uncontrolled eating, emotional eating, food addiction diagnosis, loss of control, and clinical significance. VC finishers had significant improvements in eating disorder examination shape concern and global score. There was greater drop out in the VC group but was well accepted among finishers.	VC-based treatment is feasible and could be potentially effective. Requires long-term large-scale trial to assess efficacy.

3.3 Inclusion of Self-Help Interventions

Five of the other 7 included studies involved a self-help intervention. Types of self-help interventions included Guided Self-Help CBT (CBT-GSH), Unguided Self-Help CBT (CBTsh), Guided Self-Help Dialectical Behavioral Therapy (DBT-GSH), Unguided Self-Help DBT (DBT-USH), Self-Esteem Unguided Self-Help (SE-USH), and a GSH online program. Study duration ranged from 10 weeks to 6 months. Participant number ranged from 40 to 135. Studies were based in Canada (2), USA (2), and Switzerland (1).

Self-Help Materials

The self-help materials used varied (Table 3.5). Three of 5 self-help interventions were based on CBT self-help and used the book “*Overcoming Binge Eating*” by Christopher G. Fairburn (1995 or 2013 edition). The DBT interventions used “*The DBT Solution for Emotional Eating*” book by Safer et al. (2018). Within the DBT study, the unguided self-help active control group was given a copy of “*Self-Esteem: A Proven Program of Cognitive Techniques for Assessing, Improving, and Maintaining Your Self-Esteem*” by Matthew McKay and Patrick Fanning (Carter et al., 2020). Lastly, BED-Online (The GSH online program) used a shortened version of a “CBT manual of Munsch et al. (2018)” (Wyssen et al., 2021, p. 941).

Table 3. 6 Self-Help Materials

Author	Treatment Group(s)	Self-Help Material
Cachelin et al., 2019	Culturally adapted CBT-GSH vs. waitlist control	Overcoming Binge Eating by Christopher Fairburn (1995)
Tasca et al., 2019	Step 1: Unguided Self-Help Step 2: Randomized to GPIIP vs. no treatment control	Overcoming Binge Eating by Christopher Fairburn (2013)
Peterson et al., 2020	ICAT-BED vs. CBT-GSH	Overcoming Binge Eating by Christopher Fairburn (2013)

		“The DBT Solution for Emotional Eating” by Safer et al. (2018)
Carter et al., 2020	DBT-GSH vs. DBT-USH vs. SE-USH control	“Self-Esteem: A Proven Program of Cognitive Techniques for Assessing, Improving, and Maintaining Your Self- Esteem (McKay & Fanning, 2016)
Wyssen et al., 2021	BED-online vs. 2 waitlist groups (standard or positive expectation)	Shortened CBT manual of Munsch et al. (2018)

Use of “Overcoming Binge Eating” for Self-Help CBT Treatment

Cachelin et al. (2019), culturally adapted CBT-GSH treatment to incorporate a food guide that included both American and Latino foods, strategies to deal with marianismo (traditional gender roles in Latina culture), and instill hope and encouragement to overcome any negative feedback or lack of support from family members. The supporters were trained to be culturally sensitive and were tasked with explaining treatment rationale and keeping the participants focused on using the book. There were 8 weekly guidance sessions with a duration of 25 minutes each session. (Cachelin et al., 2019)

Tasca et al., 2019 tested a stepped care model that used CBTsh as the first step, followed by randomization of participants into either Group Psychodynamic Interpersonal Psychotherapy (GPIP) or a no treatment control. The GPIP focused on cyclical relational patterns (CRP) which includes acts of self, acts of others, and expectations of others. This group therapy addressed the possible maladaptive interpersonal patterns that may influence maintenance of binge eating. It was completed over 3 stages; 1) therapists focused on understanding participant CRPs, CRP role in distress and binge eating, and development of group cohesion, 2) therapists challenged CRPs and helped with reducing distress, negative affect, and binge eating, and 3) Reinforced new CRPs and self-concepts (Tasca et al., 2019).

Peterson et al., 2020 compared CBT-GSH with BED adapted Integrative Cognitive Affective Therapy (ICAT-BED). The CBTsh group used the Fairburn text, paired with 10 sessions for support, motivation, encouragement, and accountability. ICAT-BED targets negative affect that triggers binge-eating episodes. It integrates behavioral intervention with emotion-focused techniques. This treatment is comprised of 4 phases: 1) promotion of treatment engagement, motivation, psychoeducation, and self-monitoring, 2) emphasis on nutritional rehabilitation through meal planning and adaptive coping, 3) target negative emotion (self-directed and interpersonal), and 4) relapse prevention. There is an emphasis on momentary awareness throughout all 4 phases (Peterson et al., 2020).

The studies that used the Fairburn texts all indicated significant improvements in BED symptoms and cultural adaptation was shown to be highly effective (Cachelin et al., 2019). The second step (GPIP) in the stepped care model did not provide any additional significant benefit for binge eating symptoms beyond CBTsh alone but could potentially reduce attachment avoidance and interpersonal problems (Tasca et al., 2019). The ICAT-BED and CBT-GSH had significant and similar large reductions in binge eating episodes. The studies using *Overcoming Binge Eating* self-help book were effective for reducing binge eating frequency regardless of adaptations or provision of guidance.

Other Self-Help Materials

DBT guided and unguided self-help was investigated with the SE-USH as an active control. DBT for BED is based on the concept that binge eating is an attempt to cope with uncomfortable feelings and focuses on adaptive emotion regulation skills. This includes mindfulness and distress tolerance. Therapists used manuals that provided the guidance structure for DBT-GSH participants. There were 6 sessions via a video calling program for provision of support,

clarification of concepts, and progress guidance. The SE-USH group focused on cognitive behavioral techniques for self-esteem and did not address binge eating (Carter et al., 2020).

The GSH online program was titled BED-Online. Wyssen et al. (2021) evaluated the BED-Online program efficacy and patient acceptance. They also investigated whether induction of positive expectations in a waitlist group would influence results. There were 2 waitlist groups where only one received positive messaging throughout a 4-week waiting period. After the waiting period, they were both given the same BED-Online treatment. The treatment was based on CBT and comprised of exercises during and between sessions. The participants were encouraged to apply the interventions to their daily lives. The therapists sent feedback after each session that was customized to each individual according to individual needs such as responses to questions, patient progress, etc. Each contact corresponded with 8 weekly online sessions, followed by 3 booster sessions at 1, 3, and 6 months (Wyssen et al., 2021).

All groups showed significant reductions in binge eating episodes. Wyssen et al. (2021) did not indicate any significant additional benefit from induction of positive expectations prior to treatment. Self-help is a promising alternative for dissemination of DBT, self-esteem focused CBT, and BED-Online. Further efficacy studies are needed.

Table 3. 7 Inclusion of Self-Help Summary

Author	Country	Treatment Group(s)	Duration	n	Result	Conclusion
Cachelin et al., 2019	USA	Culturally adapted CBT-GSH vs. waitlist control	12 weeks	40	Treatment group resulted in significant reduction in binge eating frequency, depression, and psychological distress. 47.6% CBT-GSH group were abstinent from BE at post-assessment. CBT-GSH participants reported high satisfaction with the program. No significant results in waitlist group	CBT-GSH treatment can be highly effective in addressing Latina's with BED and can improve BED symptoms.
Tasca et al., 2019	Canada	Step 1: Unguided Self-Help CBT Step 2: Randomized to Group Psychodynamic Interpersonal Psychotherapy (GPIP) or no treatment control	Step 1: 10 weeks Step 2: 16 weeks	135	First step of CBTsh alone resulted in statistically significant reductions in the frequency of binge eating (large effect) and eating disorder pathology (medium effect). Changes in attachment scores were significant but small. In the second step, there was no difference in change in frequency of binge eating between GPIP and the control group. GPIP resulted in significantly greater decline in attachment avoidance and interpersonal problems.	A second step of a stepped care approach did not significantly reduce binge-eating symptoms beyond the effects of CBTsh alone. There was some evidence that the second step could potentially reduce factors known to maintain binge eating, such as attachment avoidance and interpersonal problems.
Peterson et al., 2020	USA	Integrative Cognitive Affective Therapy (ICAT-BED) vs. CBT-GSH	17 weeks	112	Both groups had significant decreases in objective binge-eating episodes. Emotion regulation, cognitive self-discrepancy, self-directed style, depression, anxiety, impulsivity, and negative affect showed similar improvement at EOT and follow-up. No significant difference between groups. Treatment retention and suitability was significantly higher for ICAT-BED than CBTgsh. No differences between groups for expectations, compliance, and abstinence rates	Results suggest that ICAT-BED and CBT-GSH are comparable in improving binge eating, psychopathology, and putative maintenance mechanisms. Changes were generally sustained at 6-month follow-up. The study highlights value in adapting EMA as a measure of treatment to measure binge-eating behavior in the natural environment.
Carter et al., 2020	Canada	Dialectical Behavioral Therapy Guided Self-Help (DBT-GSH) vs. DBT	12 weeks	71	Participants in all three conditions reported significant reductions in binge frequency with large effect sizes and maintained at follow-up. Secondary outcome variables including eating disorder psychopathology,	All three conditions showed significant results. Self-help may be an effective way to disseminate DBT for BED. Suggested evaluation of DBT self-help with larger sample size

		Unguided (DBT-USH) vs. Self-help Control (SE-USH)			general psychological distress, and health-related quality of life all had significant improvement with no between group differences. SE-USH rated the treatment as less suitable than other two groups.	
Wyssen et al., 2021	Switzerland	BED-online vs. 2 waitlist groups (standard or positive expectation)	8 weeks, booster sessions at 1, 3, and 6 months (total 3 boosters)	63	Treatment satisfaction was high. The treatment led to a significant reduction of weekly binge-eating episodes compared to control during the 4-week waiting period. There were significant improvements in all outcome measures during active treatment for all groups. No differences between three groups. Email-based positive expectation induction during waiting period prior to the treatment did not have any additional beneficial effect.	The short internet based GSH program was well accepted and effective for treatment of core BED features. Positive expectation induction did not have any effect on treatment results.

3.4 Miscellaneous Group Interventions

Two studies did not fit into the other categories of self-help inclusion or pilot/POC study. These other studies consisted of trials focused on behavioral activation (BA) (a component of CBT) and an impulsivity focused group therapy (IMPULS). Both were conducted in 90-minute, weekly group sessions. The duration was 8 and 10 weeks, with 80 and 96 participants, for IMPULS and BA respectively. BA treatment groups included 4 to 7 patients and IMPULS had 4 to 6 patients per group. The studies were conducted in Sweden and Germany. (Alfonsson et al., 2015; Schag et al., 2019)

The BA group therapy protocol was developed by 2 of the study authors. The sessions covered the treatment rationale, self-monitoring, behavioral experiments, problem solving, goal directed behavior, management of avoidance and emotional dependence, making positive habits, verbal diffusion, social skills, goal setting, value-based behavior, and maintenance. Overall focus included activity scheduling. Participants were instructed to plan and engage in daily activities that were meaningful and positively reinforcing for them. There were no components that addressed dieting or eating patterns. The scheduling of activities is believed to disrupt routines, decrease positive reinforcement from binges, and increase aversive control (Alfonsson et al., 2015).

The IMPULS study was the first RCT on this approach; a group CBT treatment focused on impulsivity. The treatment was developed from previously adapted CBT interventions for addiction and other eating disorders. The sessions included psychoeducation, treatment goal development, self-monitoring, self-control strategies, food cue exposure, response prevention, reflection, and maintenance. The self-monitoring tasks were given as homework and centered on

binge eating episodes and situational risks. The overall aim was to reduce BE symptoms through addressing impulsive eating behavior (Schag et al., 2019).

These two studies were behavioral interventions that focused on impulsivity, low activation, and negative affect with group therapy. Both BA and IMPULS significantly reduced depressive symptoms and binge episodes but were not significantly different between treatment and control groups for binge eating episodes at end of treatment. Both treatment groups revealed sustaining effects on BED symptoms at follow up (Alfonsson et al., 2015; Schag et al., 2019).

Table 3. 8 Miscellaneous Group Summary

Author	Country	Treatment Group(s)	Duration	n	Result	Conclusion
Alfonsson et al., 2015	Sweden	Behavioral Activation vs. waitlist control	10 weeks	96	The BA treatment improved weight concern and had a positive effect on depressive symptoms but there was no significant difference between the groups regarding binge eating and most other symptoms. BA group's binge eating episodes continued to decrease at follow up. Lack of follow up data available for control.	Improved mood but lack of effect on binge eating suggests that dysfunctional eating is maintained by other mechanisms than low activation and negative mood. Future studies need to investigate whether effects of BA on binge eating might emerge later than at post-assessment
Schag et al., 2019	Germany	IMPULS vs. control (no treatment, not on waiting list)	8 weeks	80	Binge eating episodes were reduced in both groups at end of treatment. Only IMPULS group showed further improvement at follow-up. Eating pathology was reduced in the IMPULS group and partly in both at follow-up. Depression was only reduced in the IMPULS group. Impulsivity and BMI did not change in either group.	Differences in BE episodes between groups were insignificant EOT but IMPULS has sustaining effects on core BED symptom reduction that are not observed in the control. IMPULS may be promising to address BE, eating pathology, and depression.

Chapter 4 – Review & Discussion

The current scoping review was a standalone project to map the current landscape of research on treatment modalities specific to BED based on DSM-V criteria. Studies included in this review were categorized based on study features of being a pilot/proof of concept trial, inclusion of self-help interventions, and miscellaneous group therapy. The pilot/POC category was created to highlight and evaluate possible patterns in approaches that are in preliminary stages of testing. The number of studies (5 out of 11) that included self-help interventions seemed to represent study focus similarity and therefore were in their own category. The final 2 studies included group therapies that did not fit in either of the former categorizes and were classified as miscellaneous group interventions.

Pilot/POC Trials

There was preliminary support for the compassion-based treatments. The compassion-focused self-help therapy (CFTsh) and compassionate attention and regulation of eating behavior (CARE) treatments improved psychological well-being and binge eating symptoms. Both provided initial education, but some of the focus of education differed. CFTsh provided education on regular, balanced, and planned eating and CARE provided education focused on eating regulation, emotional regulation, and the binge cycle. CFTsh participants were encouraged to follow a structured eating plan and CARE did not include any instruction or encouragement to follow any eating plan. Instead CARE mostly focused on present awareness, mindfulness, and cultivating compassion. Both were educated on managing binge urges with self-compassion tools. The self-compassion tool that was included in both treatments was the use of compassionate imagery and participants in both groups were guided through compassionate imagery exercises in the initial educational sessions ((Duarte et al., 2017; Kelly & Carter, 2015).

Since only CFTsh included the Fears of Compassion Scale (FSC), the positive effect of low fear of compassion rating on eating disorder pathology could not be assessed in the CARE group.

The inhibitory training was concluded to be feasible and acceptable to finishers. It was based on a very simple design that attempts to use a behavioral intervention to increase impulse control. This design was shorter in duration since it was for proof of concept, with only 3 sessions over 2 weeks. Since both treatment and control groups reported significantly lower binge eating episodes, this study does not support treatment efficacy. However, it is reasonable to consider that more sessions over a longer duration may present significant findings. If future studies support this approach, it may be a simple, cost-effective, and highly disseminable form of treatment for lowering binge eating frequency.

The videoconferencing (VC) based treatment compared with face to face (F2F) treatment was the only trial based on a multidisciplinary approach that included a Registered Dietitian Nutritionist (RDN). This study was also the only intervention that included any focus on physical activity. Although Yu et al. (2021) had recruited participants between fall 2015 and 2016, the publication is exceptionally relevant in healthcare provision since the Covid-19 pandemic. The lack of change in weight and binge eating frequency for both groups indicate weak evidence for a multidisciplinary approach. Despite this being a pilot study, this work contributes to the body of evidence regarding evaluation of treatment outcomes through VC delivered care.

With two studies (50%) based on compassion focused self-help therapy, it is possible that there is an increasing focus on self-compassion. However, the low number of these types of studies that met inclusion criteria, hinders the ability to observe any true trajectory of emerging approaches. A review of only pilot studies with different search criteria may reveal a different pattern.

Trials Including Self-Help

The Inclusion of self-help category was further divided into two subcategories: use of Overcoming Binge Eating and other self-help materials. There is general acceptance that CBT is the first-line intervention for ED's and there has not been focus on reevaluation of its efficacy. The aim of the studies that included self-help was not to investigate CBTsh but to use it as a foundation for development of treatment strategies or used for comparison.

Self-help CBT interventions that were based on Fairburn's text, included 2 adaptations and one as a comparison group. Cachelin et al. (2019) developed a culturally adapted form of CBTsh that added additional components to help correct possible cultural barriers to treatment effectiveness. The materials were provided in Spanish and guidance addressed common conflicts that may arise within the culture. The finding that the culturally adapted CBT-GSH was effective and acceptable to participants is significant because of the underrepresentation and lack of data on efficacy with minority groups. The second adaptation using Fairburn's text was used to test a stepped care approach that has been suggested to be more appropriate than multidisciplinary. However, Tasca et al. (2019) did not follow the suggestion for stepped care to be tailored to disease severity where a second step of more intensive treatment is recommended based on necessity. Instead, participants were randomized into a more intensive treatment or no treatment groups without consideration of severity or necessity. This provides an explanation for the non-significant differences in binge frequency after the second step. Regardless of the lack of effect from the second step, overall, there was a significant reduction in binge eating episodes, which provides additional evidence to support self-help CBT.

The third and last treatment group that used Fairburn's text was used for comparison with Integrative Cognitive-behavioral therapy (ICAT-BED), a more novel approach. The use of

CBTsh as a comparative measure is reasonable as evidenced by the previous studies that used the same text effectively. The lack of significant differences between groups could indicate that ICAT-BED may be just as effective as CBT-GSH.

ICAT-BED “emphasizes enhancing awareness of momentary emotion, skill development, and understanding the functional nature of being-eating episodes” (Peterson et al., 2020). This treatment is similar to dialectical behavioral therapy (DBT) in that DBT focuses on “development of more adaptive emotion regulation skills” (Carter et al., 2020). Both treatments targeted emotional awareness and skill development but used different treatment designs. ICAT-BED is an individual psychotherapy and Carter et al. (2020) tested self-help DBT. The DBT self-help study was the only one that used an active control that did not address binge eating. This control was unguided and used a self-esteem self-help (SE-USH) book which also resulted in significant reductions in binge eating. The study provides evidence supporting efficacy of DBT self-help (guided and unguided) and supplementary evidence for SE-USH.

BED-Online was the only intervention that was based on CBT that did not use Fairburn’s text. BED-Online used an internet-based program instead of self-help books and was the only self-help that included booster sessions. Although this treatment showed significant results, the use of an online based treatment limits this treatment to individuals who have access to a computer and reliable internet. These are much more costly to obtain than a self-help book that has a one-time cost. All three approaches, ICAT-BED, DBT self-help and BED-Online are newer interventions with promising results.

It is notable that all treatment groups resulted in significant reductions in binge eating frequency. The use of self-help has been shown to be a promising treatment method that could be widely disseminated and cost effective. The various adaptations display the complex nature of

BED and have the potential to provide a collection of self-help treatments that can be selected for individualization.

Miscellaneous Group Therapy Trials

The two studies on BA and IMPULS focused on treating the associated characteristics of impulsivity, low activation, and negative affect with group therapy. The mechanisms that precipitate binge episodes are practical areas of attention, however both treatments did not have significant effects on binge eating when comparing treatment and control groups at end of treatment. The secondary positive effects on depression may show that these treatments are promising as adjunct interventions.

Participants

The change in the frequency of binge-eating episodes required for diagnosis of BED from DSM-IV to the DSM-V has made the diagnosis less strict, requiring 1 less day over half the original span of time. This change increases the pool of eligible participants and is possible that a larger pool may increase heterogeneity in the patient sample, indicating the presence of additional moderators and predictors of BED. Although all included studies used the DSM-V criteria, none included specific inclusion or exclusion based on the new severity rating. It is possible that with the exclusion of severe comorbidities, more severe cases of BED were excluded. There was no exclusion criteria for age for the current review and the mean (SD) age range was from 27.0 (8.9) to 45.0 (12.0) years. This displays a lack of BED research on the younger, adolescent populations and older populations. The exclusion criteria used in included studies varied which may indicate potential for confounding factors that are not taken into consideration.

The additional focus in this scoping review on participant characteristics, revealed issues that have consistently been mentioned in available research literature regarding sex and racial

disparities. Males, racial/ethnic minorities, and low SES populations continue to be underrepresented in clinical trials. These interventions may not be generalizable to all populations for this reason. Every demographic measure was inconsistently measured between studies with the exception of age and BMI and some studies included did not collect other demographic data altogether. The lack of data and consistency issues when make it challenging to study the BED population through aggregated data.

Study measures

There were 56 distinct measurement tools across 18 categories, with the most variety of tools used to measure mood, eating behavior, and general study feedback. The types varied significantly for secondary outcome measures but the tools that were most consistent were the Eating Disorder Examination interview (EDE) and Eating Disorder Examination Questionnaire (EDE-Q). Few other measures can be directly compared between studies due to the variations of secondary outcome focus and variance in tools used. The variability in measurement tools call for an evaluation of whether there are optimal tools for measurement of common variables of interest. A consensus in tools and terminology may improve evaluation and direction of future BED-related research.

Limitations

A major limitation of this review was that the research, screening, and analysis was completed by one person, which increases the chance for bias. For the studies selected, there was a wide variety of treatment designs and measurement tools, which made qualitative categorization an imperfect and subjective process. Another limitation is that the inclusion of only DSM-V diagnostic criteria and exclusion of other EDs may have eliminated viable intervention strategies.

Research that includes other EDs and used ICD criteria may help to explore other promising types of treatment strategies for BED.

Chapter 5 – Conclusion & Recommendations

The current scoping review showed that since the diagnostic criteria for BED was changed from DSM-IV to DSM-V, there has been significant effort toward adapting treatments to increase accessibility and dissemination of treatment. However, there is a lack focus on any one type of therapy. Research does not seem to include any re-evaluation of CBT individual psychotherapy or self-help versions. There is limited evidence in support of multidisciplinary and stepped care approaches, which is contrary to some recommendations. The self-help interventions are consistently effective in addressing binge eating and are being tested with adapted CBT and third wave therapies. ICAT-BED was compared with CBT-GSH and were shown to be similarly effective. Within BED studies, there was limited inclusion of other disciplines such as dietetics and physical therapy/exercise specialists. Diet education, planning and structure were included in some but not all treatments. Population disparities continue to exist and data on males and minorities are still limited.

Promising new areas of study are compassion-based therapies, cultural adaptation, and DBT self-help. Within the promising areas, researchers should take into consideration the outcome variables that are used in previous similar studies to assess whether study outcomes are similar. More studies are needed to assess efficacy of multidisciplinary and stepped approaches with varying designs in structure. The addition of new approaches attempts to addresses the high percentage of relapse in BED patients who undergo CBT. Future development of research should consider evaluation of effectiveness of different diet plans and structure within interventions and develop recruiting strategies that will encourage and support males, minorities, and those with low SES to participate. Individualization of treatment selection may be possible as more treatments and evidence emerge on demographics of individuals with BED.

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Appendix A - Additional Reference Tables

Table A. 1 Exclusion Criteria Summary

Author	Pub. Year.	Exclusion Criteria for Severe mental illness
PILOT/POC		
Kelly and Carter	2015	In current treatment for BED (except a stable dose of antidepressants), pregnancy, serious uncontrolled medical illness known to affect eating, co-morbid substance-related disorder
Duarte et al.	2017	Receiving current psychological treatment for BED, current comorbid severe mental disorders (e.g., bipolar disorder, severe major depression, schizophrenia, substance abuse), pregnancy, medical or endocrine disorders affecting appetite control, illiteracy, or significant cognitive impairment.
Giel et al.	2017	Severe somatic disorder, current substance dependence, psychotic disorder, suicidal crisis, pregnancy or lactation, non-correctable impairments of vision, previous bariatric surgery, intake of psychoactive medication except SSRIs, current attendance of psychotherapy for BED or a structured weight-loss intervention, insufficient language proficiency.
Yu et al.	2021	Current bulimia nervosa, substance abuse, suicidal ideation, psychotic disorder, bipolar disorder, serious unstable medical conditions that influence weight or eating, current psychotherapy, antipsychotic or weight-affecting medications, pregnancy and/or lactation.
SELF HELP		
Cachelin et al.	2019	Current pregnancy, medical condition or medication that significantly affects weight or eating (e.g., hypothyroidism), brain injury or impairment affecting recall or ability to complete assessments, serious medical condition or medical risk that would require immediate hospitalization.
Tasca et al.	2019	Not speaking English, pregnancy (current or planned within next year), enrollment in other psychotherapies/weight loss programs (current or planned within next year), comorbid bipolar, psychotic, or substance use disorders
Peterson et al.	2020	Unable to read English, lifetime history of psychotic symptoms or bipolar disorder, substance use disorder within 6 months of enrollment, medically or psychiatrically unstable (e.g., acute suicidality), purging behavior more than once per month for the previous 3 months, diagnosis of bulimia nervosa, medical condition impacting eating or weight (e.g., a thyroid condition), history of gastric bypass surgery, pregnant or lactating, currently receiving weight loss or eating disorder treatment, taking any medication impacting eating or weight (e.g., stimulants), psychotropic medication changes in the 6 weeks prior to enrollment.

Carter et al.	2020	Current treatment for binge eating with a registered psychologist, major medical illness (e.g., diabetes), pregnancy, exceeding a cut-off of 5 on the Drug Abuse Screening Test (DAST-10; Skinner, 1982) or 16 on the Alcohol Use Disorders Identification Test
Wyssen et al.	2021	Pregnancy, presence of another serious psychological or medical condition warranting priority treatment, lack of sufficient German language or of technical skills to access the program (both self-reported).
Other		
Alfonsson et al.	2015	Severe mental illness (schizophrenia, suicidal ideation, or untreated bipolar disorder) Ongoing alcohol or drug abuse
Schag et al.	2019	Current suicidality, substance addiction, psychotic disorders or bipolar I disorder, current psychotherapy, pregnant or breastfeeding, somatic conditions which influence eating behaviour or body weight (e.g., diabetes, thyroid diseases) and in which medication had been adapted in the last 3 weeks.

Table A. 2 Glossary of Measurement Tools

ABBV	MEASURE	Description	n*	Category
AUDIT-C	Alcohol Use Disorders Identification Test	Screens for alcohol-related substance abuse disorders (Peterson et al., 2020).	1	Substance abuse
BADS	Behavioral Activation in Depression Scale	25-items measures activation and other behaviors related to negative mood. Has four subscales: activation, avoidance, work/school impairment, and social impairment (Alfonsson et al., 2015).	1	Mood
BDI	Beck Depression Inventory	21-item self-report inventory of depressive symptoms. Calculated total scores result in minimal depression (0-13), mild depression (14-19), moderate depression (20-28) and severe depression (29-63) (Yu et al., 2021).	4	Mood
BDI-FS	Beck Depression Inventory Fast Screening	Short version of BDI-II: Assess depressive symptoms 7-items during past 7 days (Wyssen et al., 2021)	1	Mood
BES	Binge Eating Scale	16 Item self-report questionnaire that measures severity of binge eating symptomology. Includes emotional, cognitive, and behavioural dimensions of binge eating (Duarte et al., 2017)	1	Eating behavior
	Berridge	Rating of wanting and liking of food picture pre- and post-training (Giel et al., 2017)	1	Study Feedback

BIAAQ	Body Image Acceptance and Action Questionnaire	12-item self-report questionnaire that assesses the ability to openly accept body image-related internal experiences without attempts to avoid or alter them (Duarte et al, 2017).	1	Body Image
BIS-15	Barrat Impulsiveness Scale, short version	Measures impulsiveness. Includes subscales: nonplanning, motor impulsiveness, and attentional impulsiveness (Schag et al., 2019).	1	Impulsivity
BIS/BAS	Behavioral Inhibition System/Behavioral Activation System questionnaire	Each subdomain (BIS vs. BAS) calculated as arithmetic means. Higher BIS indicates stronger tendency of behavioural inhibition. Higher BAS indicate stronger tendencies of behavioural activation (Schag et al., 2019).	1	Impulsivity
BISS	Body Image Shame Scale	14-item scale that assesses body image shame, i.e., negative self-evaluations and evaluations that others negatively evaluate the subject's physical appearance (Duarte et al, 2017)	1	Body Image
BMI	Body Mass Index	Calculated with height and weight = kilograms divided by height in meters squared (Duarte et al, 2017)	All	Physical Measure
BSI	Brief Symptom Inventory	18-item self-report measure. Assesses general psychological functioning by providing a General Severity Index. Has Spanish version that demonstrated construct validity and reliability (Cachelin et al, 2019). Measures frequency of distress from various symptoms of psychological distress over past week. Adapted to 4 weeks for Carter et al. (2020).	2	Psychological Health
CAAS	Compassion Attributes and Actions Scales	Measures compassion according to traditional definitions. Focuses on motivation to attend to one's and others' suffering and alleviate or prevent it. Focuses on 3 orientations of compassion: to self, to others, and capacity to be open and aware of the compassion from others. In each of the 3, includes 2 subscales assessing attributes (sensitivity to suffering of others) and actions (commitment to try to alleviate and prevent suffering). Duarte et al. (2017) study used the scale compassion for self.	1	Compassion
CES-D	Center for Epidemiological Studies for Depression	20-item measure of weekly depressive symptoms over the previous week. (Kelly & Carter, 2015)	2	Mood
CEQ	Credibility/Expectancy Questionnaire	6-item measure with two subscales: Credibility (assesses beliefs regarding the strength of the treatment) and Expectancy (assesses the extent to which participants feel their symptoms will drop during the intervention period) (Kelly & Carter, 2015).	1	Study Feedback
CFQ-FC	Cognitive Fusion Questionnaire - Food Craving	7-item self-report measure that assesses the degree to which individuals are fused with disturbing and undesirable thoughts and cravings about food (Duarte et al, 2017).	1	Cravings
CIA	Clinical Impairment Assessment	16-item self-report measure. Assesses psychosocial impairment related to eating disorder symptoms (Peterson et al., 2020)	1	Psychosocial/interpersonal

CS	Computerized Selves	Measures self-discrepancy. Participants provide reports of perceived actual self and self-standards (Peterson et al., 2020).	1	Self-Perception
CSQ	Client Satisfaction Questionnaire	8-item instrument used to examine patient satisfaction with medical and psychological health services. Operates well in both English and Spanish (Cachelin et al., 2019).	1	Study Feedback
		Duarte et al. (2017).: How frequently they practiced the exercises, their perceived utility and importance, and general feedback on the program and practices		
		Giel et al. (2017): Questionnaire to assess acceptability and feasibility. Topics included subjective need/ interest in training, expectations associated with training participation, detailed questions about effects of the training on eating behavior, overall satisfaction with the training, and with specific aspects of the training sessions.		
		Carter et al.: Custom suitability and effectiveness rating		
		Wyssen et al: 11-item, Treatment satisfaction questionnaire		
	Custom Feedback data	Yu et al. (2021): 6 items on concern from personnel, adequacy of information about the study, satisfactory of answers to questions, personnel knowledgeable and professional, feel they learned, and overall experience. Open ended questions asked about satisfaction with the program, LMHC and RDN.	5	Study Feedback
DASS21	Depression, Anxiety, and Stress Scale	21-item DASS21 comprises three subscales measuring depression, anxiety, and stress symptoms (Duarte et al., 2017).	1	Mood & Anxiety
DEBQ	Dutch Eating Behavior Questionnaire	Measures eating pathology. Has 3 subscales: restrained eating, emotional eating, and external eating. External eating measures impulsive eating behaviour (Schag et al., 2019).	1	ED Assessment
DERS	Difficulties in Emotional Regulation Scale	36-item measure of emotion regulation. Includes 6 subscales: nonacceptance of emotional responses, difficulties engaging goal directed behavior when distressed, difficulties with impulse control when distressed, lack of emotional awareness, limited access to emotion regulation strategies, and lack of emotional clarity (Peterson et al., 2020)	1	Emotion regulation
EAT	Eating Attitude Test	26-item screening tool that assesses dieting, bulimic and food preoccupation, and oral control. Subjects who score 20 or higher have an increased risk for eating disorders (Yu et al., 2021)	1	Eating behavior
ECR	Experiences in Close Relationships Scale	36-item self-report measure. Two dimensions: Attachment Avoidance and Attachment Anxiety (Tasca et al., 2019).	1	Psychosocial/interpersonal

EDE	Eating Disorder Examination	Clinical interview to assess frequency and intensity of key behavioural and psychological features of eating disorders. Has 4 subscales: restraint, eating concern, shape concern, and weight concern. Can provide a measure of overvaluation of weight and shape. Mean of 4 subscales provides global score of overall eating psychopathological severity (Duarte et al, 2017).	7	ED Assessment
EDE-Q	Eating Disorder Examination Questionnaire	Generates global score of overall eating disorder pathology from 0-6 and as 4 subscale scores reflecting dietary restraint, eating concerns (e.g., worries about losing control overeating), weight concerns, and shape concern (Kelly & Carter, 2015) Number of items in questionnaire varied and were noted as 22, 28, or 36-items.	8	ED Assessment
EMA-ReTAINE	Ecological Momentary Assessment	Use of Real Time Assessment in the Natural Environment (Re-TAINE) system via smart phone. Measures positive and negative affect scale, profile of mood states, ratings of overeating, loss of control eating, and binge eating (Peterson et al., 2020).	1	Eating Behavior & Mood
EROS	Environmental Reward Observation Scale	10-item measure of engagement in positively reinforcing activities (Alfonsson et al., 2015).	1	Other
FCQ-S-r	Food Craving Questionnaire state-reduced	Assesses state properties of food cravings. Includes 15 items, with three subscales that reflect lack of control, reinforcement, and hunger (Giel et al, 2017).	1	Cravings
FCQ-T-short version	Food Craving Questionnaire short version	Measures intensity of general desire to eat (Schag et al., 2019).	1	Cravings
FCS	Fears of Compassion Scale	Three-section measure that assesses fears related to giving and receiving compassion. In Kelly & Carter study, only the 15-item section assessing fear of self-compassion was administered. (Kelly & Carter, 2015)	1	Compassion
FFMQ	Five Facet Mindfulness Questionnaire	37-item self-report questionnaire that assesses the distinct facets of trait mindfulness. Includes subscales: observe; describe; act with awareness; nonjudgement; and non-reacting (Duarte et al, 2017).	1	Mindfulness
FSCRS	Forms of Self-Criticism and Self-Reassurance Scale	22-item scale measures critical and self-reassuring responses to setbacks or disappointments. Measures two forms of self-criticism: inadequate self, (a sense of personal inadequacy) and hated self (the desire to hurt or persecute the self). The scale also measures self-reassurance when things go wrong (Duarte et al, 2017).	1	Self-Perception
	Help-seeking	Indication of if they are receiving treatment for an eating or weight problem, have ever received treatment, if they currently felt they had a significant eating problem, and if they currently wanted help (Cachelin et al., 2019).	1	Other

HADS	Hospital Anxiety and Depression Scale	Measure symptoms of depression and anxiety (Alfonsson et al., 2015).	1	Mood & Anxiety
HR-QOL-SF6D	Health-Related Quality of Life-Short Form 6D	Quality of life measure. Includes 6 dimensions: physical functioning, role limitations, social functioning, pain, mental health, and vitality (Walters and Brazier, 2003).	1	Quality of Life
HRS	Homework Rating Scale	12-item scale about the client/participant, task, and therapist/researcher characteristics that have been linked to compliance with homework assignments. Self-report on compliance (Kelly & Carter, 2015)	1	Study Feedback
IIP64	Inventory of Interpersonal Problems	64-item self-report scale. Assesses overall interpersonal distress (Tasca et al., 2019)	1	Psychosocial/interpersonal
IWQOL-Lite	Impact of Weight on Quality of Life-Lite (short form)	31-item self-report measure of obesity-specific quality of life. Assesses physical function, self-esteem, sexual life, public distress, and work. Higher total score indicates better quality of life (Yu et al., 2021).	1	Quality of Life
Mini-DIPS	Diagnostic Interview for Mental Disorders, short version	Structured interview to verify BED diagnosis and assess mental disorders according to DSM-5 (Wyssen et al., 2021).	1	ED Assessment
OBE-F	Objective Binge Eating Frequency	Participants asked to report frequency of objective binge eating (Kelly & Carter, 2015)	1	Eating behavior
RSEQ	Rosenberg Self-Esteem Questionnaire	10-item measure to assess self-esteem and general feelings of self-worth (Peterson et al., 2020).	1	Self-Perception
SAS-M	Modified Social Adjustment Scale	45-items with 7 domains of social life: work, housework, social and leisure activities, extended family, marital, parental, and family unit (Alfonsson et al., 2015).	1	Psychosocial/interpersonal
SASB-SF	Structural Analysis of Social Behavior Intrex Questionnaire-short form	8-item measure to assess self-directed behavior (e.g., self-criticism and self-control) (Peterson et al., 2020).	1	Self-Perception
SCID-IV	Structured Clinical Interview for DSM-IV	Semi-structured interview used to diagnose Axis I mental disorders based on DSM-IV. BED diagnostic criteria modified according to DSM-V (Tasca, et al., 2019)	3	Psychological Health
SCL-90R	Symptom Check List	90-item self-report instrument. Assesses a broad range of psychological problems and symptoms of psychopathology, including somatization, obsessive-compulsive behaviors, depression, and anxiety. Global indices included Global Severity Index, Positive Symptom Distress Index, and Positive Symptom Total (Yu et al., 2021).	1	Psychological Health
SCS	Self-Compassion Scale	26-item measure that assesses the tendency to be compassionate towards oneself at times of distress and disappointment. It yields six subscale scores: self-kindness vs judgement, common humanity vs isolation, and mindfulness vs overidentification. (Kelly & Carter, 2015; Duarte et al, 2017)	2	Compassion

STAI	State-Trait Anxiety Inventory	20-item self-report questionnaire. Assesses anxiety (Peterson et al., 2020)	1	Anxiety
TFEQ	Three-Factor Eating Questionnaire	18 item self-assessment tool. Measures cognitive restraint, uncontrolled eating, and emotional eating (Yu et al., 2021)	1	Eating behavior
TRIPED	Tape Rating Instrument for Psychotherapy of Eating Disorders	Has an adherence to psychodynamic therapy scale. 3rd party trained judges rate recordings of sessions (Tasca et al., 2019).	1	Study Feedback
TSPE	Treatment Suitability and Patient Expectation Questionnaire	2-item measure. Rate suitability and perceived treatment success. Treatment acceptability (Peterson et al., 2020).	1	Study Feedback
UPPS-R	Impulsivity Scale	Urgency subscale (Peterson et al., 2020)	1	Impulsivity
WBQ	Weekly Binges Questionnaire	7-items used to assess regularity of eating, frequency and characteristics of binge eating episodes and compensatory behaviour in last 7 days (Wyssen et al., 2021).	1	Eating behavior
WSAS	Work and Social Adjustment Scale	5-item questionnaire. Assess functional impairment in work, family, and social functioning (Wyssen et al., 2021).	1	Psychosocial/interpersonal
YFAS	Yale Food Addiction Scale	Assesses addiction-like eating based on seven diagnostic criteria for substance dependence in DSM-IV. 27 items assessing frequencies, and some items require yes/no answers. The Single-factor structure. A total score reflecting symptom severity can be calculated. There is a cut-off score for the classification of food addiction (Giel et al, 2017). Includes items on tolerance, withdrawal, and loss of control in eating behaviors and attitudes about food (Yu et al., 2021).	3	Eating behavior

*Number of studies that used the measure