



HHS Public Access

Author manuscript

Int J Nurs Health Care Res (Lisle). Author manuscript; available in PMC 2025 January 16.

Published in final edited form as:

Int J Nurs Health Care Res (Lisle). 2024 ; 7(5): . doi:10.29011/2688-9501.101549.

Complementary and Integrative Health Use in Binge Eating Disorder: A Cross-Sectional Mixed-Methods Study of Binge Eating Disorder Experts' Perspectives

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Abstract

Introduction: Binge Eating Disorder (BED) has high lifetime prevalence rates, low treatment success rates, and high rates of treatment dissatisfaction, early discontinuation of care, and recurrence. Complementary and integrative health (CIH) interventions (non-mainstream practices used with conventional approaches for whole-person treatment) hold potential to overcome many treatment barriers and improve BED treatment outcomes. Some CIH interventions have empirical support for use in eating disorders. However, little is known about the current state of CIH use in BED.

Methods: This mixed-methods cross-sectional study collected information from BED experts about CIH use in adult BED treatment. Fourteen expert BED researchers and clinicians were

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Conceptualization, B.B. and H.Z.; methodology, B.B. and H.Z.; formal analysis, B.B. and H.Z.; investigation, B.B. and H.Z.; resources, B.B.; data curation, B.B.; writing—original draft preparation, B.B.; writing—review and editing, B.B., A.J.S., M.S., K.B., C.B., and H.Z.; supervision, H.Z., B.B.; project administration, B.B. and H.Z. Online artificial intelligence (e.g., BING chat ([bing.com](https://www.bing.com)) and ChatGPT (openai.com)) was used as an editorial tool for manuscript preparation. All authors have read and agreed to the published version of the manuscript. All authors agree to be accountable for the content of the work.

⁶ Conflict of Interest

The authors declare that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

identified based on federal funding, PubMed-indexed publications, practice in the field, leadership in professional societies, and/or popular press distinction. Anonymously recorded semi-structured interviews were analyzed by 2 investigators using reflexive thematic analysis and quantification.

Results: Expert opinions and experiences on/with CIH use were generally positive/supportive (64%) with mixed views (36%) varying by intervention and empirical support. The interventions most commonly described were mindfulness (71%), yoga (64%), and supplements/vitamins/pre-/probiotics/herbs (64%). Supplements/vitamins/pre-/probiotics/herbs had mixed views; all other interventions were generally viewed positively. The benefits most commonly associated with specific interventions (e.g., mindfulness, yoga, supplements) were: regulating/tolerating emotions/mood/stress/anxiety (50%); healing the relationship with the body/body image/movement/exercise-trauma (29%); biological/physiological benefits (29%); and directly supporting treatment (“space for self-separate from treatment,” behavior change, “tolerating treatment”) (29%). Intrinsic self-healing (e.g., patient-driven healing that comes from the patient’s innate desire to heal based on the patient’s lived experience(s)) and investigative research were also associated with CIH use broadly. Most experts (57%) expressed familiarity with existing literature/research for 1 CIH intervention; 50% identified a need for empirical testing. Half (50%) spontaneously described using 1 CIH intervention in their own clinical practice/center. The most used interventions were yoga (43%), meditation/mindfulness (29%), and acupuncture (21%). Eight experts (57%) endorsed the importance of correct implementation; 43% acknowledged CIH use in conventional treatments (2nd-wave CBT, 3rd-wave behavior therapies).

Discussion & Conclusions: CIH interventions can complement current BED treatments to improve clinical outcomes, particularly managing anxiety/stress/mood, healing the relationship with the body, addressing biological/physiological deficiencies, and tolerating treatment (thus reducing treatment dropout). Empirical testing is warranted with a particular need for randomized controlled trials and guidelines on implementation and use.

Keywords

Binge eating disorder; Binge eating; Eating disorder; Eating disorder treatment; Complementary and integrative health; Alternative medicine; Mindfulness; Yoga

1. Introduction

Binge eating disorder (BED) is the most prevalent eating disorder globally, affecting nearly 3 million adults in the U.S. alone [1]. It is an autonomous DSM-V-TR diagnosis characterized by two-hour episodes of rapidly consuming objectively large amounts of food due to loss of control associated with distress, guilt, and shame, occurring at least once per week for at least three months [2]. The disorder is associated with high lifetime prevalence rates (e.g., 4.5–31% of U.S and global populations experience BED at some point in their lifetime) [1,3]. It is also associated with complicated health sequelae (e.g., anxiety, depression, obesity, cardiovascular disease, diabetes, and low self-esteem) that significantly impairs quality of life [1, 4–9].

Standard of care interventions for BED include psychological interventions (e.g., cognitive behavioral therapy (CBT), CBT-self-help, interpersonal therapy, and psychodynamic

therapies), medications (antidepressants, anticonvulsants, and anti-obesity/weight loss medications), nutritional counseling, and behavioral weight loss [10]. A variety of additional evidence-based practices are also gaining increasing use in the context of BED, including family-based therapy and other psychodynamic therapies (FBT) (which do have some guideline support in the context of BED)[10,176] as well as humanistic therapy [176], dialectical behavioral therapy (DBT), and DBT guided self-help [177,178] These standard BED interventions generally have low treatment success rates (38.3%–43.6% [1, 4]), high recurrence rates (49%–64% [1,11]), high treatment dissatisfaction [12], and early discontinuation of care [12]. For example, CBT has a 50% success rate in fully alleviating BED symptoms [13,14]. Pharmacotherapy for BED is less effective than CBT and does not enhance the success of CBT in BED symptom alleviation [13,14]. For this reason, currently available pharmacotherapies are not recommended for treating BED [13] and novel treatment approaches are needed [15].

Complementary and integrative health (CIH) interventions hold potential to overcome many treatment barriers [15] and improve BED management and care [16–19]. The United States' National Centers for CIH (NCCIH) define CIH interventions as “a group of diverse medical and health care systems, practices, and products that are not presently considered to be part of conventional medicine,” [20]. These are commonly used as a complementary or integrative component of standard therapy and can be classified broadly as: 1) physical [e.g., massage, spinal manipulation]; 2) psychological (e.g., mindfulness and spiritual practices, meditation, psychotherapy); 3) nutritional (e.g., special diets, dietary supplements, herbs, and pre/probiotics); and 4) combinations of modalities 1–3 above (e.g., mind-body interventions, yoga, acupuncture, and mindful eating) [20].

CIH interventions have been increasingly used and studied for various mental health conditions [20–23], including eating disorders broadly [16–19,24–45] and BED specifically [16–19,24–26,33,34,36–38, 40,42,46,47]. Studies support potential roles for mindfulness and self compassion practices [16,19,24,33,35,37–41], supplements [16,43], herbs [16], pre/probiotics [44], and mind-body interventions (e.g., yoga [16–19,24–45,48–50], acupuncture [16–19,24–45], hypnosis [16], meditation [51], and Traditional Chinese Medicine (TCM) [18]) in the context of eating disorders broadly (16–19, 24–45) and binge eating disorder specifically [16–19,24–26,33,34,36–38,40,42,46,47]. However, there are currently no existing data on actual real-world use of CIH interventions in the context of BED treatment.

Therefore, this manuscript aims to explore the opinions, perspectives, and experiences of BED experts (researchers, clinicians, and healthcare administrators) on CIH use in BED treatment. We conducted and recorded semi-structured interviews with 14 expert BED researchers, clinicians, and healthcare administrators and analyzed their responses for themes using reflexive thematic analysis [52,53]. Based on participant responses, we identified the following 8 themes:

1. Expert familiarity with CIH use (broadly) in BED treatment (100% of experts made statements related to this theme).

2. Opinions on CIH use (broadly) in BED treatment (100% of experts made statements related to this theme).
3. Specific CIH interventions spontaneously identified in the context of BED management and care (93% of expert statements related to this theme).
 - a. Mindfulness (71% of experts made unprompted statements about this intervention, 10/14).
 - b. Yoga (64% of experts made unprompted statements about this intervention, 9/14).
 - c. Supplements, vitamins, probiotics, & herbs (64% of experts organically addressed these interventions, 9/14).
 - d. Meditation (50% of experts made unprompted statements about this intervention, 7/14).
 - e. Acupuncture (50% of experts made unprompted statements about this intervention, 7/14).
4. Therapeutic outcomes associated with CIH use in BED (93% of unprompted expert statements aligned with this theme, 13/14).
 - a. Benefits associated with CIH use (broadly) (36% spontaneous endorsement, 5/14).
 - b. Benefits associated with specific CIH interventions (71% spontaneous endorsement, 10/14).
 - i. Regulating/managing anxiety/stress/emotion/mood (50% spontaneous endorsement, 7/14).
 - ii. Healing and strengthening positive relationships with the body and movement (29% endorsement, 4/14).
 - iii. Biological/physiological benefits (29% spontaneous endorsement, 4/14).
 - iv. Directly supporting recovery (29% spontaneous endorsement, 4/14).
 - v. Additional benefits (29% spontaneous endorsement, 4/14).
5. Empirical support (71% spontaneous endorsement of this theme, 10/14).
6. Importance for correct implementation (57% spontaneous endorsement of this theme, 8/14).
7. Experts' use of CIH interventions clinically in BED treatment (50% spontaneous endorsement, 7/14).
8. Expert awareness of CIH use in current conventional treatments (43% spontaneous endorsement, 6/14).

2. Methods

2.1. Participants and Recruiting

Researchers, clinicians, and healthcare administrators were identified as adult BED experts and recruited based on systematic eligibility criteria shown in Table 1 and as previously published [9,54,55].

2.2. Procedure

The study was approved by the National University of Natural Medicine IRB (#HZ12120) and was conducted as described previously [9,54,55]. BB sent eligible participants a scripted email study invitation. Consenting respondents were interviewed anonymously on Zoom ([Zoom.com](https://zoom.us), last accessed 19 May 2022), with verbal consent obtained at the start of each interview. Interviews were recorded with participant consent. Recordings began after introductions, to protect participant anonymity. Most interviews were scheduled for two hours, with abbreviated 30–60-minute interviews conducted as needed. Interview questions pertaining to BED treatment are shown in Table 2. Demographic information was collected at the end of each interview verbally or through a follow-up email survey.

2.3. Data Analysis

Interview recordings were transcribed and de-identified. BB, MS, and HZ separately reviewed-, qualitatively analyzed-, and coded transcripts for themes, then discussed and finalized themes through reflexive engagement with the data (e.g., reflexive thematic analysis [52,53]). BB and CB also quantified the number of participants expressing positive/supportive, neutral, or negative/skeptical perspectives on each theme [56–58], with HZ and CB consulted on quantification questions and tiebreakers.

2.4. Participant Response Rate and Characteristics

Thirty-eight participants met the eligibility criteria and were invited to participate and 14 consented and participated (Figure 1). Six participants met the academic/research criteria (43%, 6/14), five met the clinical criteria (36%, 5/14), one met both the academic/research and clinical criteria (7%, 1/14), and two met a combination of criteria from the academic- and clinical categories to qualify for inclusion in a mixed option (14%, 2/14) (Table 1). Thirteen of the 14 participants provided demographic information, which is shown in Table 3.

3. Results

All fourteen experts (14/14, 100%) responded to the domain question asking participants to describe their perspectives or knowledge on literature and research, current clinical guidelines, and their own personal (professional) experiences relating to current CIH treatment interventions utilized and/or considered for clinical care and treatment of adult BED.

3.1. Theme 1: Expert Familiarity with Complementary and Integrative Health Use (Broadly) in Binge Eating Disorder Treatment (100%)

Nine participants (9/14, 64%) reported some level of familiarity with CIH intervention use in the context of BED (Table 4). Five participants (5/14, 36%) reported not being familiar with CIH interventions used or tested in the context of BED but then went on to express some level of familiarity with CIH use.

“I think there are ...three different basic approaches... [“to CIH interventions]: ... [First], in BED, there’s been a strong track record of mindfulness work. ...there’s ... funded studies in that regard. ...[Second], in our setting in treatment, broadly, not just for people who have BED, ... we have done a lot of yoga. And then the third bit ...relates to sort of various things, you know, complementary types of supplements or other kinds of treatments. ...the third group, the complementary medication, or medical or supplement treatments, those are I think ...really hard to do. It’s hard to know what to make of those. Within reason, I try pretty hard to be kind of evidence-based and ...well, I’m not sure about these complementary supplements or substances or medications, because ...I don’t know if this is something that’s helpful or not. I think yoga ...has to be done correctly. It’s often, I think, critical for it to be done by the right person. That can be really helpful for managing the distress that comes with making the behavioral changes that occur in treatment.” (P5)

“I am under-informed as far as my overall knowledge [of CIH use in the context of BED]. However, I’m also very, very interested and a big believer in complementary and other forms of medicine. For example, chromium, zinc, using alternative interventions for mood like St. John’s or some probiotics, you know, all of these things I’m very interested in. I get a journal called the Life Extension Foundation Journal ... and I actually signed up to do a training in functional medicine, but I just never had time. ...At my treatment center or pilot centers, I had a doctor that was trained in functional medicine and now I have a nurse practitioner that I collaborate with, so I will have her see my patients if I want them to have a functional medicine intervention and I think it’s incredibly valuable. I’m very very interested in it myself and I think it’s another underutilized modality basically.” (P7)

3.2. Theme 2: Opinions on Complementary and Integrative Health Use (Broadly) in Binge Eating Disorder Treatment (100%)

Nine participants (9/14, 64%) expressed positive/supportive views on CIH use for BED when referencing CIH use broadly, rather than specific to a singular/specific CIH modality/intervention (Table 4). Five participants expressed mixed views on CIH intervention use (5/14, 36%), with mixed views varying by intervention and empirical support, as described in theme 3, subtheme four, foci I, ii, and v (sections 3.3.4.1, 3.3.4.2, and 3.3.4.5 in the supplementary material S1) and in theme 5 (section 3.5 in this results section below). Most CIH interventions were viewed and described positively; however, the category of supplements, vitamins, pre/probiotics, and herbs had mixed views (5 hesitant/cautious/reluctant, or negative descriptions and 4 positive descriptions, as described in theme 3,

subtheme 4, foci I (section 3.3.4.1 in the supplemental material S1). Mixed or negative views were also expressed about the use of any intervention that is not empirically supported or used “off protocol” with an empirically supported intervention (described further in section 3.5).

“[Regarding CIH use in BED treatment,] I’d say bring it! ...Our field generally has ... gotten a little too in love with traditional medical models [and focusing on] drug trials. ...humans are not just [bags of bones with brains that are all] inputs [and] outputs [and] titrate some meds and we’re all good. ...We’re not seeing tons of effectiveness of our medicines, and I’d say ask for evidence, but I think there’s certainly a role for more holistic practices ...as long as they’re supported.” (P19)

“I’m a pragmatist, so if there’s something that doesn’t hurt you and [can] help you, and is a good intervention, why not [use it]? When you think about acupuncture, massage, and [other] complementary interventions to reduce stress through various ways: [they are] so awesome. ...but you have to be careful that you are not [just using] everything you find on Google. ...you have to make sure you keep things safe, and you should look for good evidence.” (P53)

“I think that there’s skepticism among some [regarding CIH interventions] but it’s ...for the same reasons, I think, as there is skepticism about a lot of treatments for binge eating disorder, which is that people want to see evidence. ... and they want it to be credible, trustworthy evidence, and that has meant a big reliance on randomized controlled trials.” (P38)

See also P60, P75, and P46 quotations in Table 4.

3.3. Theme 3: Specific Complementary and Integrative Health Interventions Spontaneously Identified in the Context of Binge Eating Disorder Management and Care (93%)

3.3.1. Theme 3, Subtheme 1: Complementary and Integrative Health Interventions Identified in the Context of Adult Binge Eating Disorder (71%)—Thirteen participants (13/14, 93%) spontaneously identified 21 different CIH interventions used in the context of BED (Table 5). These interventions most commonly included:

- a. Mindfulness (71% spontaneous endorsement, 10/14).
- b. Yoga (64%, 9/14).
- c. Supplements, vitamins, probiotics, and herbs (57%, 8/14).
- d. Meditation (43%, 6/14).
- e. Acupuncture (36%, 5/14).
- f. Massage (21%, 3/14).
- g. Mind-body interventions (14%, 2/14).
- h. Traditional Chinese Medicine (TCM) (14%, 2/14).

Additional CIH interventions described by one participant each (1/14, 7% each) included aromatherapy, art therapy, break room(s), breath work, bright light therapy, dance therapy, essential oils, pet therapy, prayer, and Tai Chi/Qi Gong. In the category of “supplements/vitamins/probiotics/herbs,” “supplements” were identified by 43% of experts (6/14); probiotics were identified by 21% of experts (3/14), vitamins were identified by 14% of experts (2/14), herbs were identified by 7% of experts (1/14).

See quotation from P5 in section 3.1 above and P60 in 3.4.2..

“I talk a lot [with my patients] about the data around mindfulness. I tell them how much I hate mindfulness and meditation, but how much it helps. ...The fMRI data [is] astonishing –the most recent data [suggests that] even a small meditation practice changes threat sensitivity. I mean, I don’t even know what to say except Marsha Linehan was right! You put it in DBT [dialectic behavioral therapy] early on, and most of our patients hate it [but] ...we used to think you had to get to a calm state [for meditation or mindfulness to be effective]; it turns out if you hate it the entire time, and you’re thinking about your target [hate] list, and you refocus your thoughts, that’s like weightlifting for your brain. So obviously, I have a lot of enthusiasm about it.” (P72)

“I think the [CIH interventions] that are important to note for all the wrong reasons are probably diet supplements, which are very much presented as being complementary therapies [but] all you’re doing really is feeding the person full of either the next molecule down from amphetamine or stuffing them full of caffeine and oddly enough, that’s not on the [product labeling]. ...A few years ago, it was green tea capsules [that] were being pumped like mad here for people wanting to lose weight, and that’s fine if you say, ‘by the way, this contains the equivalent of seven espressos.’ Then the person buying it would [be] able to make sense of that, but that’s not said. [What is said is that] it’s your ‘miracle weight loss cure,’ which messes with the person’s nutrition and emotions. It messes with their biology to the point where they’re quite likely to binge even more. So that’s what I’m most worried about [regarding the use of CIH interventions like supplements that lack empirical support].” (P84)

3.3.2. Theme 3, Subtheme 2: Analyses of Specific CIH Interventions Spontaneously Identified in the Context of Adult BED (71%)—Foci were identified within the sub-themes of mindfulness, yoga, supplements/vitamins/pre-/probiotics/herbs, meditation, and acupuncture. These foci generally included:

- a. Expert familiarity with and opinion of the intervention.
- b. Empirical support.
- c. Clinical use.
- d. Clinical benefits and uses.
- e. Use in conventional treatments (in mindfulness and meditation).
- f. Importance for correct implementation.

- g. Challenges in client uptake (especially for mindfulness and meditation).
- h. “The mindfulness movement” including meditation and yoga.
- i. Media/consumer-driven uptake of supplements/vitamins/pre-/probiotics/herbs.

These subthemes and foci as well as example participant quotes supporting each sub-theme and foci are included in the supplementary material, S1.

3.4. Theme 4: Therapeutic Outcomes Associated with Complementary and Integrative Health Use in Binge Eating Disorder Treatment (93%)

3.4.1. Theme 4, Subtheme 1: Benefits Associated with CIH Use Broadly in the Context of BED (36%)—Five participants (5/14, 36%) described a total of 7 different functions for CIH use broadly (not specific to any particular intervention) in the context of BED, in which the function was not related to any singular CIH intervention (Table 6). These functions were:

- a. Helping patients tolerate the hardships of treatment (21% spontaneous endorsement, 3/14)
 - i. This was addressed as a function for CIH interventions broadly by 2/14 participants (14%).
 - ii. One additional participant addressed this as a function of yoga specifically (1/14, 7%).
- b. Helping with mood and/or anxiety regulation/tolerance (14% spontaneous endorsement, 2/14).
- c. “Healing from the inside out” (14%).
- d. Probe research (e.g., basic science research used to inquire and learn more about a topic) (14%).
- e. Bridging the current gap in treatment success rates (7%).
- f. “Treating the person as a whole” (7%).
- g. Providing space for self-care that is separate- or away from treatment (e.g., time/therapy “off the ward,” “takes one away so they can clear their head,”) (7%).

“Generally, for eating disorders, ...a hugely important part of treatment is trying to help people tolerate what they need to do treatment-wise, and that makes complementary approaches potentially really relevant. ... Most of the time we really have to work to help people [in eating disorder treatment] tolerate treatment, and I think that’s a potential role for complementary approaches. I think it’s a wonderful role for yoga. ...In eating disorders, I don’t think [complementary and integrative health interventions are] going to make [eating disorders] go away. I think [they’re] going to [help] people with symptoms ...hang in there [by] helping with anxiety, helping with cognitive rigidity, or whatever it is.” (P5)

“Complementary medicine is fantastic as probe research, you know, like, ‘what happens when you do this? How does the brain react? What kind of behavioral manifestations do you see?’” (P72)

3.4.2. Theme 4, Subtheme 2: Benefits Associated with Specific Complementary and Integrative Health Interventions in the context of Binge Eating Disorder (71%)—Ten participants (10/14, 71%) spontaneously described a total of 7 broad categories of benefits and functions associated with one or more specific CIH interventions (Table 6). These broad categories included:

- a. Awareness, management/regulation or reduction of anxiety, mood, stress, or emotions (50% endorsement, 7/14).
- b. Benefits related to the relationship with the body and movement (29% spontaneous identification, 4/14).
- c. Biological/physiological benefits (29%, 4/14).
- d. Benefits that directly support recovery (e.g., coping with symptoms, tolerating treatment, promoting behavior change) (29%, 4/14).
- e. Food/eating regulation (21%, 3/14).
- f. Self-care (21%, 3/14).
- g. Negative outcomes that bypass, undermine, or worsen the treatment process (14%, 2/14).

“...A mindfulness practice – whether it’s meditation or yoga – ...can really help people to reestablish sleep, which helps to reestablish their hunger and satiety cues, which helps to regulate their mood ...sleep does all those magic things. ...and it’s an important piece to be integrated into eating disorder treatment. [contd. below]

“...I think the mindful movement ...there’s been a number of interesting studies looking at ...the use of yoga therapy in the treatment of eating disorders that show really impressive results. ...that as an added component of treatment [it] really helps propel people further in their relationship with their body, and their anxiety reduction than treatments without yoga [do]. So I think mindful eating and yoga are my two clinical go-to’s [for mind-body connection], and particularly mindful movement for people who might be in a body larger than some people are comfortable with them being in, and just from a physiological perspective, sometimes living in a larger body has mobility constraints and yoga can be an incredibly impactful intervention [that can] help people relate to their bodies in a different way and in a more connected way.” (P60)

3.4.2.1. Theme 4, Subtheme 2, Foci i: Regulating/Managing Anxiety/Stress/Emotion/Mood (50%): Seven participants (7/14, 50%) described one or more specific CIH interventions as being used for:

- a. Reducing anxiety (29% spontaneous endorsement, 4/14).

- b. Managing mood (29%, 4/14).
- c. Managing stress (21%, 3/14).
- d. Emotion awareness and regulation (14%, 2/14).

The interventions most commonly identified in this category were:

- e. Acupuncture (identified by 21% of participants, 3/14).
- f. Yoga (21%, 3/14).
- g. Massage (14%, 2/14).
- h. Meditation (14%, 2/14).

3.4.2.1.1. Theme 4, Subtheme 2, Foci i, Subfoci a: Anxiety Reduction and Stress Management (29%, 21%): Acupuncture and massage were associated with anxiety reduction and stress management by 2/14 participants (14%) each; one participant each also associated yoga, nature therapy (“getting outdoors”), and meditation/mindfulness with anxiety reduction (7% each) and yoga and sleep with stress reduction (7%).

See statements from P60 in theme 3 (section 3.3 in the results section above), P72 in theme 4, subtheme 2, foci iii (3.4.2.3 in the results section below), and P93 in theme 4, subtheme 2, foci iii, sub-foci a (section 3.4.2.4.1 in the results section below).

“[mindfulness is] important [for] stress reduction [and] taking time for yourself. Very important.” (P53)

“I admit, I looked this up from PubMed, but there’s definitely emerging research around [yoga in the context of BED treatment] and certainly a lot of programs are using yoga clinically, especially sort of in the context of stress regulation, but also sort of post meals as a way to reduce discomfort in residential programs.” (P72)

“The other piece [in] the literature I think is interesting is [that] getting outdoors – even if there’s not as much bright light – just getting outdoors, and [having] connection in nature ...seems to ease depression and anxiety and improve mood.” (P60)

3.4.2.1.2. Theme 4, Subtheme 2, Foci i, Subfoci b: Managing Mood (29%): Acupuncture was associated with managing mood by 2/14 participants (14% each). Supplements (St. John’s), nature therapy (“getting outdoors”), and bright light therapy were also associated with this function by one participant each (7% each).

See statements in supplementary material S1, P60 directly above, and P72 in theme 4, subtheme 2, foci iii (section 3.4.2.3 in these results below).

3.4.2.1.3. Theme 4, Subtheme 2, Foci i, Subfoci c: Emotion Regulation (21%): Emotion regulation was associated with break rooms (in the context of anger), meditation, and yoga by one participant each (1/14, 7% each).

See statements from P7 in theme 4, subtheme 2, foci ii (section 3.4.2.2 in these results), P60 directly above, and P72 in theme 4, subtheme 2, foci iii (section 3.4.2.3 in the results below).

“I think of meditation and yoga as things we use to help people ...become more aware and regulate their emotions.” (P19)

“...We always talk about right alternative behaviors, ... – [so, patients are] labeling the emotion that they’re feeling with the behavior, and then [they identify] “how they handle that emotion – and anger is something that comes up a lot, and I don’t think that it’s always addressed. So [for that] I like sending people to break rooms because it [also] breaks [the stereotype that] anger is always this negative thing and [it shows patients that anger] can be therapeutic and it’s okay to be angry [and we don’t have to] just be these perfect little cookie cutter people ...that’s not life. ...basically, you go [to a break room] and you put on ...a hard hat and goggles and a jumpsuit, and you can break a bunch of stuff, [ceramics, etc.]. ...I’ve [also] had people [just] go and buy plates and break them. ... it’s just that release [that they need] [and] ... it normalizes anger ...in a healthy way.” (P37).

3.4.2.2. Theme 4, Subtheme 2, Foci ii: Healing & Strengthening Positive Relationships with the Body and Movement (29%):

Four participants (4/14, 29%) described one or more specific CIH interventions as being beneficial in promoting a positive, healthy relationship with the body and/or movement (described by 3/14 participants each, 21% each), and in addressing body image issues and healing trauma related to exercise and movement (described by 2/14 participants each, 14% each). Overall, yoga was the primary intervention associated with healing and strengthening positive relationships with the body and movement. All four participants associated yoga with this function (4/14, 29%), and it was identified as a primary intervention in each subclass of this function, as described below.

“Yoga, absolutely, [I love for] movement and finding ways to move that are not oppressive. ... I very strongly believe that it’s important that we heal the relationship with movement for people with BED because a lot of times, the demand to move has been like ... an oppressive demand upon the body and the psyche that is founded in shaming the person ...So [I value] ways that we begin to move the body that come from the authentic essence of the self of the person. ...because individuals with BED have the experience of their psyche being intruded upon... [which is] damaging to their psyche. So, people have to be able to move in a way that’s not compensatory. ... [The relationship with movement and the motivation to move] has to be generated from within. So as far as those interventions, you know, it could be anything related to movement ... ways of healing the body from the inside out, whatever that may be.” (P7)

3.4.2.2.1. Theme 4, Subtheme 2, Foci ii, Subfoci a: Relationship with the Body & Body Image (21%, 14%): Improving-, healing-, promoting-, or strengthening the relationship with the body was associated with yoga (by 2/14 participants, 14%); one participant each additionally associated this function with mindfulness, self-compassion, and Tai Chi/Qi Gong (1/14 each, 7% each). Yoga, mindfulness, self-care, and self-compassion were each

identified as being used in the context of body image issues by one participant each (1/14, 7%).

“I really love starting people just with yoga. Restorative yoga I think is wonderful because it’s not, ‘here, go do this work out.’ It’s: ‘let’s do something that’s really nice for our bodies.’ So, whenever I talk about body image, I really try to think about, like, ‘what are things that we can do to take care of our bodies, not punish them?’ Especially if there’s PTSD around exercise – which there tends to be with binge eating disorder – I try to approach movement [by asking]: ‘what is the intention and what is something that we need? How do we meet our needs from that perspective?’” (P37)

See statement from P7 directly above and P60 in theme 3 (section 3.3 above).

3.4.2.2.2. Theme 4, Subtheme 2, Foci ii, Subfoci b: Relationship with the Movement & Exercise (21%): Mindfulness (including mindful movement and mindfulness-based interventions (MBIs)) and yoga were both associated with healing the relationship with movement and/or promoting a healthy relationship with movement by 2/14 participants each (14% each). Two participants (2/14, 14%) additionally described using yoga in the context of healing trauma related to exercise/movement (e.g., being forced to run a mile in gym class and being ridiculed by peers while doing so).

“I think that the ... trauma of physical activity should be addressed ... the idea that [clients with BED] don’t want to work out, but it’s really that their middle school teacher was screaming at them when they were trying to do their whatever [activity in] PE [physical education] class, or they got made fun of ... I think [that’s a] barrier ... because we know that activity is great for everyone [but] it might look different for everyone as well.” (P37)

See statements from P60 in theme 3 (section 3.3) and P7 in theme 4, subtheme 2, foci ii (section 3.4.2.2 directly above).

3.4.2.3. Theme 4, Subtheme 2, Foci iii: Biological/Physiological Benefits (36%): Five participants (4/14, 36%) described one or more specific CIH interventions as being beneficial in rectifying biological or physiological deficiencies and/or imbalances in the body. Five participants identified vitamins/supplements/probiotics/herbs as being beneficial in this context (36%). Four participants (4/14, 29%) described the use of supplements, two (14%) described the use of vitamins, and one participant each described using functional food/nutrition (7%), functional medicine (7%), and herbs (7%). The supplements, vitamins, and herbs described were:

- a. Chromium (spontaneously identified by 3/14 participants, 21%).
- b. Zinc (identified by 2/14 participants, 14%).
- c. Probiotics (2/14, 14%).
- d. Estrogen/Estrogen-Promoting (1/14, 7%).
- e. Inositol (1/14, 7%).

- f. Liver-Promoting (1/14, 7%).
- g. B Vitamins (1/14, 7%).
- h. Magnesium (1/14, 7%).
- i. St. John's Wort (7%).
- j. Tyrosine (7%).
- k. Vitamin D (7%).

The following tests and tools were also identified by one participant each:

- a. Gastrointestinal mapping (7%)
- b. Hormone testing/DUTCH Hormone Test (Dried Urine Test for Comprehensive Hormones, dutchtest.com) (7%)
- c. Micronutrient testing (7%).

One participant also associated acupuncture with balancing bio-hormonal-physiological imbalances (1/14, 7%).

See P37 quote in Table 6.

"I'll certainly recommend acupuncture [to my patients]. ... There's really not much of any [peer-reviewed literature] around acupuncture [in the context of BED], but I am a huge fan of it. I think there's a lot of data on acupuncture [in the context of] hormones, headaches, pain, anything related to infertility... So to me, especially the women I see (although I've sent men there too) ... especially that group with that funky, inflammatory, GI stuff, pain, eating disorder, depression, anxiety, they have that whole horrible mix, most of them have a trauma history – that group I really love getting to acupuncture because I think it's sort of a way of hitting the reset button, but there's not much literature to support it." (P72)

3.4.2.4. Theme 4, Subtheme 2, Foci iv: Directly Supporting Recovery (29%): Four participants (4/14, 29%) described one or more specific CIH interventions as being used to support patients in tolerating the distress that often comes with treatment (identified by 4/14 participants, 29%), coping with symptoms associated with the disorder (3/14, 21%), supporting/promoting behavior change (3/14, 21%), and providing space "off the ward" (in the inpatient context) (1/14, 7%).

In this category, yoga was endorsed by 2/14 participants (14%); acupuncture, deep breathing, massage, and mindfulness were also identified by one participant each (1/14, 7%).

3.4.2.4.1 Theme 4, Subtheme 2, Foci iv, Subfoci a: Tolerating Treatment & Coping with Symptoms (29%): Two participants (2/14, 14%) described yoga as being used in the context of helping patients tolerate the distress that is often associated with treatment in residential/inpatient settings and in coping with the symptoms associated with the disorder; one participant (1/14, 7%) also described acupuncture and massage as being used in this

context. One additional participant described deep breathing and mindfulness as being beneficial in tolerating treatment and coping with symptoms in the outpatient setting.

“Yoga ...can be really helpful for managing the distress that comes with making the behavioral changes that occur in treatment. ...Most of the time, we really have to work to help people tolerate treatment and I think that’s a potential role for complementary approaches. I think it’s a wonderful role for yoga.” (P5)

“[There was a] small trial with people who were in an inpatient program [for anorexia nervosa] with severe underweight [and] they were offered ...either acupuncture or acupuncture and a massage therapy program as an adjunct to the inpatient program. ...Probably the most interesting outcome was the qualitative feedback people gave; it was very positive. They said what was most positive was the fact they were off the ward and having therapy that had nothing to do with food or eating, or the meal plan, etc. They rated the message more highly probably than the acupuncture. [The study] did measure levels of anxiety and arousal which went down with the therapy, and if you’ve ever had a massage, you’ll know that your blood pressure does go down also.” [93].

3.4.2.4.1. Theme 4, Subtheme 2, Foci iv, Subfoci b: Behavior Change: Yoga and mindfulness (including mindful eating) were described by two and one participants respectively (14% and 7%) as being useful in promoting and supporting the behavioral changes that are required as part of recovery, specifically in the context of breaking “food rules” and changing thoughts and emotions often associated with eating (either generally or eating certain foods specifically).

See quotations from P37 in theme 3, subtheme 2, foci iii and vi (sections 3.3.2.3 and 3.3.2.6 in the supplementary material S1).

“... [A big component of my treatment involves] normalizing [binge] foods. ...For instance, I had somebody who was bingeing on Taco Bell, and so her homework was to go and eat Taco Bell. [I told her]: ‘order what you want [and] eat it, being mindful, right,’ ...bringing in all of those aspects of [mindfulness], being really present while you’re eating it, not eating it fast [or] in that binge type behavior that she would experience, and then you know, now it’s like ...[a big component of treatment and recovery is] just normalizing that food.” (P37)

3.4.2.5. Theme 4, Subtheme 2, Foci v: Additional Benefits: Additional clinical benefits and functions associated with specific CIH interventions that were each described by three participants or less are included in the supplementary material S1 [3.4.2.6-3.4.2.10]. These are outlined directly below.

- a. Food/Eating Regulation (21% participant endorsement, 3/14).
- b. Trauma, Healing, & Self-Care (21%, 3/14).
- c. Potential Harms (21%, 3/13).
- d. Sleep (7%, 1/14).

- e. Generic, Nonspecific Benefits (7%, 1/14).

3.5. Theme 5: Empirical Support (71%)

Ten (10) participants (10/14, 71%) addressed the issue of empirical support as it pertains to CIH use in the context of BED (Table 7).

3.5.1. Theme 5, Subtheme 1: Express Familiarity with Existing Complementary and Integrative Health Literature (57%)—Eight participants (8/10, 57%) expressed familiarity with existing literature or research on at least one CIH intervention used in the context of BED specifically or eating disorders broadly. The interventions identified as having existing literature bases were:

- a. Mindfulness (29% spontaneous endorsement, 4/14).
- b. Acupuncture (29% spontaneous endorsement, 4/14).
 - 1. One participant referenced acupuncture use in anorexia nervosa (7%).
 - 2. One participant referenced acupuncture use in mental and physical health more broadly (7%).
- c. Yoga (21% spontaneous endorsement, 3/14).
- d. Massage (14%, 2/14).
- e. Meditation (14%, 2/14).

One participant each also identified one of the following interventions in relation to existing empirical support in the context of BED: intuitive eating, mindfulness-based interventions (MBI), mindful eating, and self-compassion (1/14, 7% each). One individual also addressed the category of supplements, vitamins, pre/probiotics, and herbs as having a literature base in the context of mental health broadly (e.g., the use of Vitamin D in depression).

See P5 statement in theme 1 (section 3.1 above) and P93 statement in theme 4, subtheme 2, foci iv, subfoci a (section 3.4.2.4.1 above).

“...There’s an emerging literature base that says mindfulness-based interventions, both from a mindful eating and a mindful movement perspective, turn out to work really well.” (P60)

“There’s a fairly strong evidence base for acupuncture, and so it’s a little bit weird that it hasn’t taken off more.” (P5)

3.5.2. Theme 5, Subtheme 2: Express a View that Literature on Complementary and Integrative Health Use in Binge Eating Disorder is Lacking (36%)—Five participants (5/14, 36%) spontaneously identified one or more CIH intervention as not having empirical support. The interventions identified in this context were:

- a. Supplements and herbs (21% spontaneous endorsement, 3/14).
- b. Acupuncture (7% spontaneous endorsement, 1/14).

c. Traditional Chinese Medicine (TCM) (1/14, 7%).

Supplements/vitamins/herbs/pre/probiotics were described as having media/consumer-driven popularity (see theme 3, subtheme 4, foci v (section 3.3.4.5) of supplementary material S1). One participant also stated that while some CIH interventions have been examined in the context of anorexia nervosa, there are no studies testing CIH interventions in the context of BED (1/14, 7%). Additionally, two participants stated they were unfamiliar with the literature base and could not comment on whether literature existed or not.

See P5 statement in theme 1 (section 3.1) and P60 statement in theme 2 (section 3.2) above.

“I know that ... over the years, ... there’s been some acupuncture literature... though I think that literature in the eating disorder field isn’t terribly deep, possibly in part because insurance coverage for those services is not widely accepted and that then, in many ways, dictates what gets studied and what gets implemented clinically.” (P60)

“I think probably most of the research [testing CIH interventions in the context of eating disorders] has been with people with anorexia nervosa. Last I looked at [the literature base], I could be wrong ...I don’t know that there have been any studies really with acupuncture [for example] with binge eating disorder. [If there is] they maybe haven’t looked at it for a while.” (P93)

3.5.3. Theme 5, Subtheme 3: Identify a Need for Empirical Testing and Support (50%)—Additionally, seven participants (7/14, 50%) spontaneously discussed a need for empirical support and high-quality studies testing CIH interventions in the context of BED. Three participants (21%) endorsed challenges to traditional testing in CIH use, given the individuality of most CIH interventions.

See P38 statement in theme 2 (section 3.2) above.

“From an evidence-based, empirically supported treatment model... if any [CIH interventions] were included in the original protocol, in [a randomized controlled trial], ...I think it’s legitimate to include them [in clinical practice]. But if they weren’t [included in the original protocol] – if you take [an empirically-supported treatment] and then you add [a CIH intervention to it] – you’re just not on the protocol anymore. ...I’m [not] opposed to alternative treatments. I’d just like to see the people who promote them take the time to do the science to make the case ... and I’d like it to be good science.” (P33)

“... You have to make sure you keep things safe, and you should look for good evidence while you’re doing that ... but then it also becomes difficult because everybody is different and then what might work for someone might not work for another person, and you need thousands of people to figure that out, and that has been difficult.” (P53)

3.6. Theme 6: Importance for Correct Implementation (57%)

Eight participants (8/14, 57%) described the importance of using CIH interventions accurately and appropriately (Table 8), especially in the following interventions:

- a. Supplements/vitamins/probiotics/herbs (29% spontaneous endorsement, 4/14).
- b. Yoga (21% spontaneous endorsement, 3/14).
- c. Meditation (14%, 2/14).

“I think Yoga ... has to be done correctly. ...I think a really critical piece is helping people do it in a way that is supportive and that either helps, or at least works with or works around body image issues, and that can be tricky. I think it can really help but ...I think some people have that kind of aversive reaction to it somewhat. ...There are people, I believe, who are doing highly physically strenuous yoga and that’s not what we provide in our treatment setting. ...that tends to feel to our people like ...higher intensity, and also ...can get to be more in the realm of eating disorder symptoms, like exercise symptoms.” (P5)

“...Meditation is wonderful ...but I think that it needs to be individualized. For some people, it’s very triggering in the sense that they just cannot sit with themselves. So definitely [meditation] needs to be guided meditation explaining what [it] is.” (P37)

“...You have to be careful that you’re not [just using] everything you find on Google, that seems to be the solution for everything... you have to make sure you keep things safe, and you should look for good evidence.” (P53)

“We’re always worried about running two psychological therapies at the same time. I think sometimes you have to be wary about running a complementary therapy and psychotherapy at the same time because you often hear [patients say]: ‘my other therapists said this,’ which, of course, leads you ending up unable to make the therapy work.” (P84)

3.7. Theme 7: Experts’ Use of Complementary and Integrative Health Interventions Clinically in the Context of Binge Eating Disorder (50%)

3.7.1. Theme 7, Subtheme 1: Complementary and Integrative Health Interventions Experts Report Using in the Context of Binge Eating Disorder (50%)—Seven participants (7/14, 50%) spontaneously described using one or more CIH interventions in their own clinical practice(s) or center(s) (Table 9). The most commonly described interventions are outlined below.

- a. Yoga (36% (5/14).
 - i. Five experts (36%) described using yoga in the context of BED.
 - ii. Six experts (43%) described using yoga in the context of eating disorders broadly.
- b. Meditation and/or mindfulness (29% described use, 4/14).

- c.** Acupuncture (21% (3/14)).
 - i.** Two experts (14%) described using acupuncture in the context of BED.
 - ii.** Three experts (21%) described using acupuncture in eating disorders broadly.
- d.** Supplements/vitamins/probiotics/herbs (14%, 2/14), including:
 - i.** Supplements (14%).
 - ii.** Vitamins (14%).

Additionally, the following interventions were described by one participant (7%) each:

- a.** Break room(s) (7%, 1/14)
- b.** Eye Movement Desensitization and Reprocessing (EMDR)(7%).
- c.** Essential oils (7%).
- d.** Functional food (7%).
- e.** Functional medicine (7%).
- f.** Functional nutrition (7%).
- g.** Intuitive eating (7%).
- h.** Massage (7%).
- i.** Tai Chi/Qi Gong (7%).
- j.** Traditional Chinese Medicine (TCM) (7%).

One participant (7%) each described using the following vitamins/supplements/probiotics/herbs in the context of BED treatment:

- a.** B Vitamins.
- b.** Chromium.
- c.** Zinc.
- d.** Estrogen/Estrogen-Promoting.
- e.** Inositol.
- f.** Liver-Promoting.
- g.** Magnesium.
- h.** Vitamin D.

One participant also described using the following tests and tools in clinical practice in the context of BED:

- a.** Gastrointestinal mapping (7%)
- b.** Hormone testing/DUTCH Hormone Testing (7%)
- c.** Micronutrient testing (7%).

See P37 statement in theme 4, subtheme 2, foci iii (section 3.4.2.3) above.

3.7.2. Theme 7, Subtheme 2: Clinical Benefits CIH-Users Associate with Their Use of CIH Interventions in the Context of BED Treatment (50%)—The seven participants who described using one or more CIH interventions in their own clinical practice or center in theme 4 (section 3.4) above spontaneously described possible or actual functions for CIH use in BED treatment. These functions included:

- a. Coping with symptoms of the disorder (43% spontaneous endorsement, 6/14).
- b. Managing stress, anxiety, or mood disorders (36% spontaneous endorsement, 5/14).
- c. Addressing biological issues (e.g., inflammation, GI symptoms) (29%, 4/14).
- d. Healing trauma (29%, 4/14).
- e. Connecting with the body (21%, 3/14).
- f. Healing the relationship with the body and movement (21%, 3/14).
- g. Coping with change (14%, 2/14).

See P7 statement in Table 9.

See P5 statement in theme 4, subtheme 1 (section 3.4.1) and P7 statement in theme 4, subtheme 2, foci ii (section 3.4.2.2) above.

“...I would think of meditation and yoga as things that we use to help people be more aware and regulate their emotions more. The other [CIH intervention] that comes to mind is acupuncture – ...I feel like I’ve heard of people using that for food control, but I never have.” (P19)

3.8. Theme 8: Awareness of Complementary and Integrative Health Use in Current Conventional Treatments (43%)

Six participants (6/14, 43%) spontaneously described the use of one or more CIH intervention(s) in clinical or conventional practice (but not necessarily their own) (Table 8). Meditation and/or mindfulness were most commonly spontaneously described in this category (36% spontaneous endorsement, 5/14), followed by self-compassion, supplements, and yoga (7 spontaneous endorsements each, 1/14 each). Meditation, mindfulness, and self-compassion were recognized by 5, 5, and 1 participant each (respectively) as being within the realm of conventional empirically supported treatments for BED through their use in second-generation CBT and third-generation behavioral therapies like DBT and MBSR.

Four participants (4/14, 29%) also spontaneously identified the use of meditation in conventional, evidenced-based/empirically supported treatments for mental health issues broadly and BED specifically (e.g., DBT and MBSR). Two of these four participants (2/14, 14%) referenced the work of Jon Kabat Zinn; two participants (2/14, 14%) referenced the use of meditation in dialectic behavioral therapy (DBT); one participant each (1/14, 7% each) referenced the use of meditation in anxiety management therapies and mindfulness-based stress reduction (MBSR) respectively.

“... You’re seeing [mindfulness-based approaches to binge eating] automatically included in DBT [dialectic behavior therapy] interventions ...and for anyone using MBSR [mindfulness-based stress reduction], you’re seeing it through that, too. [P72, contd. below]

“...[There was] a meta-analysis looking at CBT versus third-wave treatments, including mindfulness-based approaches,(59) and I think that [aspect of mindfulness] was [responsible for the improved results observed in the third-wave approaches in the analysis] ...[The analysis suggested that] the third-generation approaches – [which include] mindfulness approaches – showed very strong effects.” (P72)

“Many of our interventions are sort of a CBT model combined with a mindful eating model...” (P60)

“We see meditation getting integrated more and more into our treatments broadly, so I don’t know if that’s considered complementary.” (P19)

“Jon Kabat Zinn ...I think he’s made a huge impact in the whole field of mental health – not necessarily specific to binge eating disorder – but he’s made meditation sort of something that’s acceptable and something that is actually useful. ...Maybe the way to think about this is that DBT – or dialectical behavior therapy treatments – they totally pull from these sorts of traditions.” (P38)

“Obviously some of our anxiety management therapies are firmly based- or firmly come from [backgrounds of] meditation, from Eastern practices, Eastern religions.” (P93)

4. Discussion

4.1. Theme 1: Novelty and Innovation

4.1.1. Theme 1, Subtheme 1: Expert Opinions of- and Experiences with- Complementary and Integrative Health Use in Binge Eating Disorder Treatment

—To our knowledge, this study is among the first to synthesize expert opinion and report on CIH use in the context of adult BED treatment. Previous studies have mainly focused on the efficacy and acceptability of specific CIH interventions [17], such as mindfulness [19,24], yoga [45,49,50,60], or acupuncture [18] for BED or related symptoms. However, little is known about how BED experts view CIH use in general, what specific CIH interventions they are familiar with or use in their practice, what benefits they associate with CIH use in BED treatment, what empirical support they perceive for CIH use, what challenges they face in implementing CIH interventions, and how they recognize CIH use in current conventional treatments. Our study fills this gap by providing a comprehensive and nuanced picture of CIH use in BED treatment from the perspective of experts who have extensive experience and knowledge in BED research and treatment. Our findings also provide novel insights into the current state of CIH use and future directives for the field.

4.1.2. Theme 1, Subtheme 2: Resources for Clinicians Interested in Incorporating Complementary and Integrative Health Interventions into

Evidence-Based Binge Eating Disorder Treatment Practices—The analyses of specific CIH interventions presented in theme 3, subtheme 2 (section 3.3.2 in the supplementary material S1), as well as information presented in Table 10 and Table 11, are presented with the intent that they can be of use to clinicians interested in incorporating CIH interventions into their evidence-based practices until more formal guidelines on CIH use exist in the context of BED, thus helping to advance the field. Table 10 shows the CIH interventions experts most commonly associated with the different benefits identified in theme 4, subtheme 2 (section 3.4.2) as well as interventions that are empirically supported for each particular benefit/utility in the context of BED and/or other eating or weight disorders. In the supplemental material (S1), we provide information on themes that relate to each of the different CIH interventions identified here (theme 3, subthemes 2–6; sections 3.3.2–6 in supplemental material S1). Themes include expert opinions, clinical use, empirical support, use in conventional treatments, clinical benefits or uses, challenges in client uptake, and the importance of correct implementation. Table 11 shows benefits associated with each of the five CIH interventions most commonly recognized in section 3.3 above (as associated by experts here and in the literature), along with strengths, limitations, and caveats associated with each of the interventions. Our hope is that clinicians interested in incorporating CIH interventions into their evidence-based practices in the context of BED can use Table 10 to identify what specific interventions are empirically supported in providing benefits specific to their clients' particular needs, and can then use Table 11 and the information presented in theme 3, subtheme 2 (section 3.3.2 of the supplementary material S1) to gain a greater understanding of the use of that particular intervention in the context of BED until more formal guidelines exist.

4.1.3. Theme 1, Subtheme 3: Potential Benefits of Complementary and Integrative Health Use in Binge Eating Disorder Treatment—Taken together, the findings presented in section 3.4 and in Table 10 and Table 11 indicate a variety of CIH interventions that can be used for different purposes and functions in BED treatment, depending on the specific needs and goals of the client. These findings also suggest experts perceive that CIH interventions can offer additional benefits to BED patients that are not adequately addressed by standard treatments. Thus, CIH interventions have potential to enhance the flexibility and personalization of treatment plans for clients with BED.

The CIH functions identified in section 3.4 and in Table 10 and Table 11 reflect the multifaceted nature of BED and its underlying causes and consequences [61], as well as the holistic and individualized approach of CIH intervention use [62]. These findings also lend insights into the lived experiences of individuals with BED – based on what they share with expert providers during formal treatment – and identify novel treatment targets that can be tested to develop new CIH treatment options for individuals with BED.

4.1.4. Theme 1, Subtheme 4: Insights into the Lived Experiences of Individuals with Binge Eating Disorder from the Providers Who Help Treat Them—The narratives provided by BED experts and presented here provide important insights into the lived experiences of individuals with BED that are often novel and can help advance our understanding of BED and the underlying mechanisms that contribute-to-

drive-, and/or result from BED. For example, the context within which CIH users describe the use of yoga to heal the relationship with the body and movement – which are perceived to be highly stigmatized, “intruded upon,” commanded, and traumatized (see quotations from P7 and P37 in theme 4, subtheme 2, foci ii, subfoci a-b and theme 7, subtheme 2 (sections 3.4.2.2.1, 3.4.2.2.2, and 3.7.2)) – also lends insight into the experience(s) of individuals with BED, particularly those in larger bodies. Similar descriptions are found in qualitative feedback from mixed-methods studies testing the benefits of yoga in women with BED [49] and underscore the possible importance of addressing stigmatization, oppression, invalidation, and trauma in treatment, as has been suggested previously [54].

4.1.5. Theme 1, Subtheme 5: Clinicians May Be More Familiar with Complementary and Integrative Health Use in the Context of Binge Eating Disorder Treatment Than They Think

—This study also provides important insights into how BED experts’ self-reported understanding and use of CIH interventions for BED treatment varies from what they actually describe. For example, 36% of experts initially reported not being familiar with or using any CIH interventions in the context of BED treatment but then described several interventions and studies that they were familiar with, demonstrating familiarity. Several also described using some interventions (e.g., mindfulness, supplementation), demonstrating actual use, which was contradictory to their self-reports. This finding suggests BED experts may be more familiar with CIH interventions than they themselves understand or are aware of and may not be aware of what interventions are classified as CIH, since therapies like mindfulness and yoga have become more mainstream.

4.2. Theme 2: Relationship of Findings to the Literature

4.2.1. Theme 2, Subtheme 1: Expert Views on Complementary and Integrative Health Use in Binge Eating Disorder

—The findings of this study are largely consistent with the existing literature on CIH use in BED treatment, but also reveal some new insights and directions for future research. For example, the experts reported high familiarity with CIH interventions (section 3.1, Table 4) and most experts (64%) expressed positive opinions of their potential benefits for BED patients (section 3.2, Table 4). These findings are in line with previous surveys that have shown high interest and positive attitudes toward CIH interventions among eating disorder professionals and patients [17,25,45–47,50, 63–71].

Moreover, the experts identified mindfulness (section 3.3.2), yoga (section 3.3.3), vitamins/supplements/herbs/pre/probiotics (section 3.3.4), meditation (section 3.3.5), and acupuncture (section 3.3.6) as CIH interventions that they have used or recommended for BED treatment. These interventions are among the most commonly studied and used CIH interventions for BED or related symptoms [17–19, 24, 25, 45–47, 65, 74], suggesting some participant awareness of the current evidence base and practice trends among CIH use in BED treatment. However, it is also possible that participant awareness and practices simply align with current trends, which drive the research and publications.

4.2.2. Theme 2, Subtheme 2: Utility of Complementary and Integrative Health Use in Binge Eating Disorder

The experts described various functions and benefits that they associate with CIH use in BED treatment (section 3.4, Table 6; Table 10), such as regulating emotions, (section 3.4.2.1), improving one's relationship with the body and movement (section 3.4.2.2), improving physiological health (section 3.4.2.3), directly supporting recovery (section 3.4.2.4), and providing additional benefits (section 3.4.2.5). As addressed in section 4.1.3, many of the functions and benefits BED experts associate with CIH use in BED treatment are also supported by empirical evidence (e.g., regulating emotions, improving the relationship with the body and movement, improving physiological health, directly supporting recovery, and providing additional benefits) [17,19,24,45,74–76]. However, some of the specific functional benefits experts attributed to CIH use are novel and have not been previously described in the literature as being associated with CIH or non-CIH treatment interventions. Examples include the use of EMDR to address trauma; the use of break rooms to address anger management; the use of micronutrient testing, DUTCH Hormone testing and GI mapping to identify and address potential deficiencies and imbalances in micronutrients (e.g., chromium), hormones (e.g., estrogen), and the gut microbiome; and the use of acupuncture and yoga to promote intrinsic self-healing (e.g., patient-driven healing that comes from the patient's innate desire to heal based on the patient's lived experience(s), which contrasts a conventional treatment model in which the patient is often met with stigmatization and provided treatment instructions founded in body/weight-shaming). These functions reflect the multifaceted nature of BED and its underlying causes and consequences [61], as well as the holistic and individualized approach to CIH use [62].

4.2.3. Theme 2, Subtheme 3: Empirical Support for Complementary and Integrative Health Use in Binge Eating Disorder

Over half of BED experts (57%) demonstrated familiarity with primary literature supporting CIH use in the context of BED (section 3.5), with mindfulness, acupuncture, yoga, massage, and meditation most commonly recognized as having empirical support (section 3.5.1). These findings align with the literature base, which provides empirical support for the benefits of yoga [16,17,19,24,28–32,36,42,48–50], mindfulness and self-compassion practices [16,19,24,33,35,37–41], acupuncture [16,17,25], one herbal supplement [16,43], and potential for pre/probiotics [44], as well as for hypnosis [16], meditation [51], and TCM [18] in the context of eating disorders broadly [16–19,24–45] and BED specifically [16–19,24–26,33,34,36–38,40,42,46,47], as described in Bray et al. 2023 [77] and Table 10 and Table 11 below.

On the other hand, supplements/vitamins/pre/probiotics/herbs were specifically identified as lacking empirical support in the context of BED, despite widespread consumer use (section 3.5.2). Although one herb (*Rhodiola rosea* (*R. rosea*) and its active principle, Salidroside) [78] and pre/probiotics [44] have some empirical support for potential benefits in the context of BED, the descriptions of supplement/herb/pre/probiotic use provided here do not align with empirically-supported use, and the empirical support for *R. rosea*, Salidroside, and probiotics require further investigation and advancement before being conclusive (as described in Bray et al. 2023 [77]).

A summary of the empirical support that currently exists for CIH intervention use in BED can be found in Table 10, Table 11, and in Bray et al., 2023, which also summarizes current limitations in the field and directives for future research [77].

4.2.4. Theme 2, Subtheme 4: Current Use of Complementary and Integrative Health Interventions in Binge Eating Disorder Treatment—Half of BED experts (50%) described using one or more CIH interventions in their own clinical practice(s) or center(s) in the context of BED treatment (section 3.7). The CIH interventions most commonly described as being used in the context of BED treatment were: yoga (36% of experts described use); meditation and/or mindfulness (29% described use); acupuncture (14% described use); and supplements/vitamins/probiotics/herbs (14% described use of supplements and vitamins).

Although there are currently no existing data on the actual use of CIH interventions in the context of BED treatment, the 50% rate of CIH use in BED treatment aligns with the most up-to-date data on CIH use in mental health conditions [21] and exceeds use among general populations [22]. For example, the U.S. National Health Interview Surveys found that 32%, 36%, and 33% of adults surveyed in 2002, 2007, and 2012 reported using at least one CIH intervention (n = 218,423 total) [22], with CIH use predicted to have increased significantly since 2012 [79,80], particularly in psychiatry (81). Yoga and meditation/mindfulness, the two most commonly used CIH interventions reported here, were also the two interventions most commonly used by the 2017 U.S. National Health Interview Survey participants, with yoga use increasing from 9.5% of adult participants in 2012 to 14.3% of adult participants in 2017 and meditation/mindfulness use increasing from 4.1% participant use in 2012 to 14.2% participant use in 2017 [80]. Moreover, a U.S. nationally representative survey with 2,055 respondents conducted in 1997–1998 found that 57% of responders with anxiety attacks and 54% with severe depression reported using a CIH intervention for their condition in the past 12 months [21]. Of those, only 20% reported visiting a CIH practitioner; whereas 70% reported seeing a conventional provider who also used CIH therapies for their condition [21], suggesting ~ 40% of individuals with anxiety and depression were treated by a conventional provider with a CIH intervention. Again, it must be noted these surveys were conducted before 2012; thus, updated information on prevalence rates of CIH use is warranted, both in the general population as well as in individuals with eating disorders broadly and BED specifically.

The CIH interventions that experts describe using here are also among the most commonly studied and used CIH interventions for BED or related symptoms reported in the literature [17–19,24,25,45–47,65,74], as discussed in section 4.2.1. This similarity suggests alignment between the current evidence base and practice trends among CIH use in BED treatment.

Most importantly, our findings suggest CIH interventions can be – and have been – well integrated into conventional treatments for BED as adjunctive or complementary therapies, as has also been demonstrated in the literature [59,69, 73,82]. Experts perceive that CIH interventions can offer additional benefits to BED patients that are not adequately addressed by standard treatments, such as first-wave cognitive-behavioral therapy (CBT) or medication. These views are supported by a variety of literature demonstrating CIH

interventions (including mindfulness and yoga specifically) can help BED patients cope with negative emotions, enhance their body image and self esteem, reduce binge eating triggers, and promote overall well-being [17,19,24,45,74,75]. Overall, these and other findings suggest that CIH interventions are not necessarily incompatible or alternative to conventional treatments, but rather complementary or integrative.

4.2.5. Theme 2, Subtheme 5: Recognition of Complementary and Integrative Health Interventions in Conventional Treatments—Nearly half of BED experts (43%) recognized the use of CIH interventions in current conventional treatments (section 3.8, Table 8). In line with expert recognition, second-wave CBT (the standard eating disorder and BED treatment) does include components of mindfulness [82] and third-wave behavior therapies (e.g., dialectic behavior therapy (DBT), mindfulness-based interventions (MBIs), including mindfulness-based stress reduction (MBSR), acceptance and commitment therapy (ACT), and compassion mind training/compassion-focused therapy (CFT)) further emphasizes mindfulness and self-compassion strategies [41,83,84] with improved treatment responses [59].

These findings - along with those presented in sections 3.7 and 4.1.7 above – demonstrate a precedent for CIH use in current BED treatment that can be used to inform further integration going forward. These findings also demonstrate that CIH interventions can be - and have been - well integrated into conventional treatments for BED as adjunctive or complementary therapies with empirical support [59,69,73,82] and can provide beneficial complements or integrations to conventional treatment approaches.

4.3. Theme 3: Clinical Implications

4.3.1. Theme 3, Subtheme 1: High Level of Openness to Complementary and Integrative Health Use in Binge Eating Disorder—Our findings suggest that there is a high level of acceptance and openness to CIH use among BED experts, which may facilitate the adoption and dissemination of CIH interventions in clinical settings.

4.3.2. Theme 3, Subtheme 2: CIH Interventions Can Enhance Flexibility and Personalization of Treatment Plans—Our findings also indicate that a variety of CIH interventions exist that can be used for different purposes and functions in BED treatment, depending on the needs and goals of each client. This may enhance the flexibility and personalization of treatment plans for clients with BED.

Our findings also indicate that CIH interventions should be tailored to the individual needs and preferences of BED patients. CIH interventions are not one-size-fits-all solutions and may have different effects on different people [85]. Therefore, clinicians should assess the suitability, acceptability, and feasibility of CIH interventions for each patient and provide guidance and support throughout the process.

Table 10 and Table 11 were created to provide tools for clinicians interested in incorporating CIH interventions into their BED treatment practices. Our hope is that clinicians interested in incorporating CIH interventions into their BED treatment practices can use the information provided in Table 10, Table 11, and in section 3.3.2 of the supplementary

material S1 to guide CIH use in their respective BED treatment practices until more formal empirical testing and guidelines become available.

4.3.2. Theme 3, Subtheme 3: Importance of Standardized Implementation Guidelines—Many experts (57%) addressed the importance of correct implementation of CIH interventions (section 3.6). Supplements/vitamins/probiotics/herbs, yoga, and meditation were specifically identified in this category. Expert feedback suggests the use of supplements can be beneficial in some instances, when done under clinical supervision and preceded by appropriate diagnostic testing; however, unsupervised use of supplements and probiotics can result in high-risk levels of caffeine intake and exacerbation of BED symptoms, including fatigue, indigestion, and flatulence (see P5 statement in theme 1 (section 3.1), P84 statement in theme 3, subtheme 1 (section 3.3.1), and P60 statement(s) in theme 2 (section 3.2)).

Overall, our findings highlight the importance of correct implementation of CIH interventions to ensure optimal outcomes. CIH interventions require compatibility and integration with other evidence-based treatments, adequate training and supervision for providers, and both adherence and monitoring to ensure intervention safety and effectiveness. They also require tailoring to the needs and preferences of each specific client/patient [85]. These issues have been largely overlooked in the literature on CIH use in BED treatment but are crucial for ensuring the quality and effectiveness of CIH use - both in the context of BED and in general. Clinicians should assess the suitability, acceptability, and feasibility of CIH interventions for each patient and provide guidance and support throughout the process. Clinicians should also be aware of the potential risks and limitations of CIH interventions and refer patients to qualified practitioners when necessary. It is equally important to educate clients and individuals with BED on the importance of qualified CIH delivery and monitored use. These guidelines are highlighted in Table 11 and in theme 3, subtheme 2 (section 3.3.2 of the supplementary material S1) and are important for ensuring optimal quality and outcomes of CIH interventions for clients with BED.

4.3.3. Theme 3, Subtheme 4: CIH Interventions Can Be, Have Been, and Are Being Well Integrated into Conventional Treatments—Further, our findings suggest CIH interventions can be – and have been – well-integrated into conventional treatments for BED as adjunctive or complementary therapies, as has also been demonstrated in the literature [59,69,73,82]). Experts perceive that CIH interventions can offer additional benefits to BED patients that are not adequately addressed by standard treatments, such as first-wave cognitive-behavioral therapy (CBT) or medication [86]. For example, CIH interventions may help BED patients cope with negative emotions, enhance their body image and self-esteem, reduce binge eating triggers, and promote overall well-being [19,24,45,74,75]. These potential benefits are summarized in Table 10 and Table 11, which are designed to provide easy-to-use tools for clinicians interested in incorporating CIH interventions into their BED treatment practice(s).

4.3.4. Theme 3, Subtheme 5: Patient and Provider Narratives Lend Insight into the Lived Experience of Binge Eating Disorder—The narratives provided by BED experts about how and why they use particular CIH interventions provide important

insights into the lived experiences of individuals with BED and the underlying mechanisms that can contribute-to-, drive-, and/or result from BED. For example, the context within which CIH users describe the use of yoga to heal the relationship with the body and movement – which are perceived to be highly stigmatized, “intruded upon,” commanded, and traumatized (see quotations from P7 and P37 in theme 4, subtheme 2, foci ii, subfoci a-b and theme 7, subtheme 2 (sections 3.4.2.2.1, 3.4.2.2.2, and 3.7.2) – also lends insight into the lived experience(s) of individuals with BED, particularly those in larger bodies. Similar descriptions are found in qualitative feedback from mixed-methods studies testing the benefits of yoga in women with BED [49] and underscore the possible importance of addressing stigmatization, oppression, invalidation, and trauma in treatment, as has been suggested previously (54). Overall, the proposed benefits of CIH interventions – and the rich descriptions provided by experts about how and why they use specific interventions to target these functions – can also help provide a better understanding of the lived experiences of individuals with BED, which aligns with a desperate need in the field for taking- and letting the patient narrative(s) drive treatment plans and options, as has been addressed by us and others elsewhere (see Bray et al., 2022 for findings and discussion on the importance of taking the patient narrative) [15,54,55].

4.3.5. Theme 3, Subtheme 6: Importance of Funding and Resources to Support Empirical Testing—Overall, our findings highlight the importance of funding and resources to support empirical testing of different CIH interventions, both (a) as standalone resources that can be used by individuals who meet DSM-V criteria for BED but lack a formal diagnosis or healthcare access and (b) when used as a complement to- or integrated with – current standard BED treatments.

Generating empirical support and standardized/manualized instructions for CIH use in BED treatment can be particularly difficult for specific interventions that require individual tailoring (e.g., acupuncture)[62]. In addition to the individualized nature of CIH interventions (a), the variety in CIH intervention practitioners and intervention formats (b), and the heterogeneity of BED phenotypes (c) were identified as significant barriers to high-powered CIH studies. As one participant stated, “[the call for empirical support] also becomes difficult because everybody is different and what might work for someone might not work for another person, and you need thousands of people to figure that out, and that has been difficult,” (P53). These barriers are not unique to CIH use in BED [62]. They are often addressed in other fields by using protocols that allow for some variation around a certain level of standardization. For example, an acupuncture protocol may identify five acupuncture points that will be used in all participants – unless strongly advised otherwise by the practitioner – and allow for the use of up to five additional points, according to the practitioner’s discretion [88,89].

Another challenge to empirical testing for CIH interventions is the recently expanded modalities and settings for BED care (e.g., inpatient vs. outpatient, psychological therapies, etc.). These challenges are not unique to CIH interventions, though they can limit the ability to interpret findings associated with CIH interventions that have been tested in inpatient BED treatment settings (which differ significantly from outpatient settings). These and other considerations are addressed further in Bray et al., 2023 [77].

4.4. Theme 4: Study Limitations and Strengths

This study has some limitations that should be acknowledged. First, the study's sample size ($n = 14$) is standard for a mixed-methods analysis of this nature [9,52–58] but does limit the ability to generalize the data's themes and conclusions to the field of BED researchers, clinicians, and healthcare administrators at large. Thus, findings from this study are not necessarily generalizable. Additionally, one of the study's four possible eligibility criteria for researchers (NIH grant funding; see Table 1) presents a bias for including participants from the U.S. There were 3 other eligibility criteria researchers could meet to be included that were not dependent on nationality and the final study sample does include participants from the UK, AU, and CA as well as from the US. Nevertheless, it would have been optimal to include funding criteria for other federal agencies. CIH familiarity and use in BED treatment may vary regionally and it is possible our findings are skewed to place greater emphasis on CIH perceptions and use in the geographic locations of the experts we interviewed. Large-scale, multi-center, nationwide and international surveys on CIH use in adult BED treatment are needed and should include both providers who treat BED and adults who meet diagnostic criteria for BED (with and without formal diagnoses).

Second, the themes identified here have not been verified by the experts themselves. A follow-up questionnaire or Delphi Panel is warranted to gather their direct responses.

Third, the study did not examine the actual outcomes or effectiveness of CIH interventions for BED patients. Therefore, the findings do not provide conclusive evidence on whether or how CIH interventions work for BED treatment. Future studies should conduct large-scale nationwide and international surveys, randomized controlled trials, and/or systematic reviews to evaluate the efficacy and mechanisms of CIH intervention use and mechanisms of action in adult BED, both from the perspectives of researchers and clinicians and from individuals with BED themselves.

Fourth, there are several limitations in the demographics of the experts interviewed in this study. First, although this study's sample provides an accurate demographic representation of eating disorder experts (92% white, 100% not Hispanic or Latino), it does not accurately represent the demographic profile of individuals who experience adult BED, which has higher rates in communities of color (e.g., individuals who self-identify as Hispanic or Latinx, Black or African, Indigenous) [90–92]. The demographic discrepancies between those who study and treat adult BED and those who experience it are not insignificant [15]. These discrepancies highlight the importance of including marginalized populations in academic and clinical training opportunities for adult BED research and care, and of emphasizing community- and narrative-based approaches to research, as has been suggested previously [15,54]. Also, this study collected demographic data on sex assigned at birth but not gender. This oversight is important because gender is demographically relevant, whereas sex assigned at birth is not relevant to this study question. Further, asking for sex assigned at birth follows an old convention that fails to account for equity and diversity inclusion.

Despite these limitations, this study also has some strengths that should be recognized. First, our study addressed a novel and important topic that has received little attention in the literature: the current state of CIH use in adult BED from the perspectives and

experiences of expert researchers, clinicians, and healthcare administrators who have extensive experience in the field. Therefore, our study contributes to filling a gap in the knowledge base and advancing the field of BED research.

Second, our study uses rigorous and transparent methods to collect and analyze the data. These methods include established guidelines and procedures for data collection and analysis [52,53]. For example, this study's systematic inclusion criteria (Table 1) provide strong population representation of experts who drive the field. This includes researchers with the greatest funding and publication output (recently and historically) and clinicians with high clinical and academic affiliations as well as those most likely to be accessed by individuals with BED themselves (e.g., most commonly identified through a Google search or through popular press books on BED). As a result, the study sample includes a well-rounded balance of BED experts, including researchers, medical doctors, licensed therapists, and dieticians, as well as intuitive eating specialists, healthcare administrators, and public health advocates (Table 3). Although one of the four possible inclusion criteria for researchers involves NIH funding, this criterion was not required (researchers were required to meet one of the four possible criteria). Thus, while this criterion presents a bias for inclusion of academics within the U.S., the study sample does include a balanced geographic representation, with individuals across the U.S. as well as in the UK, AU, and CA. Additionally, the study's use of semi-structured interviews (Table 2), reflexive thematic analysis, and peer debriefing further ensure the rigor and transparency of our methodological approach, thus validating the quality and credibility of the data and findings in alignment with standard methodology in the field [52,53].

Third, this study has practical implications for research, clinical practice, and policy in the field of eating disorders. We have identified several specific CIH interventions that can be integrated into conventional treatments for BED as adjunctive or complementary therapies. We also describe various functions associated with CIH use in BED treatment and highlight the importance of correct implementation of CIH interventions for optimal outcomes.

5. Conclusions

This study explored the perspectives and experiences of BED experts on CIH use in BED treatment. We identified eight themes that reflect the experts' familiarity, opinions, knowledge, and practice of CIH interventions for BED. The findings suggest that CIH interventions can be integrated into conventional treatments for BED as adjunctive or complementary therapies that may offer additional benefits to BED patients. The findings also indicate that CIH interventions should be tailored to the individual needs and preferences of BED patients and implemented correctly to ensure safety and effectiveness. The findings have several implications for research, clinical practice, and policy in the field of eating disorders. Overall, there is a need for greater empirical testing of CIH intervention use in BED, particularly in the outpatient setting. There is also a call from experts for manualized instructions on how CIH interventions can and should be used in BED treatment of various settings (e.g., inpatient vs outpatient care).

Supplementary Material

Refer to Web version on PubMed Central for supplementary material.

Acknowledgments

The authors would like to acknowledge and thank Elissa Frankel for her work on this project and the participants who made this work possible by sharing their time, trust, perceptions, experiences, and insights. The authors would also like to acknowledge and thank Annie Wentz for pointing out the study's oversight and limitation of asking for sex assigned at birth but not gender, and for advocating for the experience of transgender individuals in which sex assigned at birth is not relevant to the study question (whereas gender is) and can often be an insensitive question to ask. Lastly, the authors would like to thank Ellie G. Ashton for his help in tabular formatting and Hoang Thi My Loan and Alena Gripass at the Chung Huong Institute (Baltimore, MD, USA) for their editorial review.

9. Funding

This research was funded by NCCIH grant number 5R90AT008924-07.

Abbreviations:

BE	Binge Eating
BED	Binge Eating Disorder
CIH	Complementary And Integrative Health
DUTCH	Dried Urine Test for Comprehensive Hormones (Dutchtest.com)
ED	Eating Disorder
EMDR	Eye Movement Desensitization and Reprocessing
GI	Gastrointestinal
LOC	Loss of Control
LOCE	Loss Of Control Eating
MBI	Mindfulness-Based Intervention
NADA	National Acupuncture Detoxification Association
OE	Overeating
R. rosea	Rhodiola Rosea
TCM	Traditional Chinese Medicine

References

1. Hudson JI, Hiripi E, Jr Pope HG, Kessler RC (2007) The Prevalence and Correlates of Eating Disorders in the National Comorbidity Survey Replication. *Biological psychiatry*. 61: 348–58. [PubMed: 16815322]
2. APA (2013) *Diagnostic and Statistical Manual of Mental Disorders: Diagnostic and Statistical Manual of Mental Disorders, Fifth Edition*. Arlington, VA: American Psychiatric Association.

3. Termorshuizen JD, Watson HJ, Thornton LM, Borg S, Flatt RE, et al. (2020) Early Impact of Covid-19 on Individuals with Eating Disorders: A Survey of ~1000 Individuals in the United States and the Netherlands. medRxiv.
4. Kessler RC, Berglund PA, Chiu WT, Deitz AC, Hudson JI, et al. (2013) The Prevalence and Correlates of Binge Eating Disorder in the World Health Organization World Mental Health Surveys. *Biological psychiatry*. 73: 904–914. [PubMed: 23290497]
5. da Luz FQ, Hay P, Touyz S, Sainsbury A (2018) Obesity with Comorbid Eating Disorders: Associated Health Risks and Treatment Approaches. *Nutrients*, 10: 829. [PubMed: 29954056]
6. Pawaskar M, Witt EA, Supina D, Herman BK, Wadden TA (2017) Impact of Binge Eating Disorder on Functional Impairment and Work Productivity in an Adult Community Sample in the United States. *International Journal of Clinical Practice*. 71: e12970.
7. Mustelin L, Bulik CM, Kaprio J, Keski-Rahkonen A (2017) Prevalence and Correlates of Binge Eating Disorder Related Features in the Community. *Appetite*. 109:165–171. [PubMed: 27899295]
8. Apovian CM (2016) Obesity: Definition, Comorbidities, Causes, and Burden. *The American journal of managed care*. 22: s176–85. [PubMed: 27356115]
9. Bray B, Bray C, Bradley R, Zwickey H (2022) Mental Health Aspects of Binge Eating Disorder: A Cross-Sectional Mixed Methods Study of Binge Eating Disorder Experts' Perspectives. *Frontiers in psychiatry*. 13: 953203.
10. Hilbert A, Hoek HW, Schmidt R (2017) Evidence-Based Clinical Guidelines for Eating Disorders: International Comparison. *Current opinion in psychiatry*. 30: 423–437. [PubMed: 28777107]
11. Grilo CM, Masheb RM, Wilson GT, Gueorguieva R, White MA (2011) Cognitive-Behavioral Therapy, Behavioral Weight Loss, and Sequential Treatment for Obese Patients with Binge-Eating Disorder: A Randomized Controlled Trial. *Journal of consulting and clinical psychology*. 79: 675–685. [PubMed: 21859185]
12. Kazdin AE, Fitzsimmons-Craft EE, Wilfley DE (2017) Addressing Critical Gaps in the Treatment of Eating Disorders. *International Journal of Eating Disorders*. 50:170–189. [PubMed: 28102908]
13. Wilson GT (2011) Treatment of Binge Eating Disorder. *Psychiatr Clin North Am* 34:773–783. [PubMed: 22098803]
14. Hay P, Chinn D, Forbes D, Madden S, Newton R, et al. (2014) Royal Australian and New Zealand College of Psychiatrists Clinical Practice Guidelines for the Treatment of Eating Disorders. *The Australian and New Zealand journal of psychiatry*. 48: 977–1008. [PubMed: 25351912]
15. Bray B, Shallcross A, Wiss D, Sadowski A, Bray K, et al. (2024) Treatment Barriers in Binge Eating Disorder: A Cross-Sectional Mixed-Methods Study of Binge Eating Disorder Experts' Perspectives. *International Journal of Nursing and Health Care Research*. Submitted/Under Review.
16. Madden S, Fogarty S, Smith C (2014) Chapter 29: Alternative and Complementary Therapies in the Treatment of Eating Disorders, Addictions, and Substance Use Disorders. In: Brewerton TD, Dennis AB, editors. *Eating Disorders, Addictions and Substance Use Disorders*. Berlin Heidelberg: Springer-Verlag. 625–647.
17. Fogarty S, Smith CA, Hay P (2016) The Role of Complementary and Alternative Medicine in the Treatment of Eating Disorders: A Systematic Review. *Eating behaviors*. 21: 179–188. [PubMed: 26970732]
18. Fogarty S, Harris D, Zaslowski C, McAinch AJ, Stojanovska L (2012) Development of a Chinese Medicine Pattern Severity Index for Understanding Eating Disorders. *Journal of alternative and complementary medicine (New York, NY)* 18: 597–606.
19. Katterman SN, Kleinman BM, Hood MM, Nackers LM, Corsica JA (2014) Mindfulness Meditation as an Intervention for Binge Eating, Emotional Eating, and Weight Loss: A Systematic Review. *Eating behaviors* 15: 197–204. [PubMed: 24854804]
20. National Centers for Complementary and Integrative Health N. *Complementary, Alternative, or Integrative Health: What's in a Name?*
21. Kessler RC, Soukup J, Davis RB, Foster DF, Wilkey SA, et al. (2001) The Use of Complementary and Alternative Therapies to Treat Anxiety and Depression in the United States. *The American journal of psychiatry*. 158: 289–294. [PubMed: 11156813]

22. Clarke TC, Black LI, Stussman BJ, Barnes PM, Nahin RL (2015) Trends in the Use of Complementary Health Approaches among Adults: United States, 2002–2012. *Natl Health Stat Report* 10: 1–16.
23. Black LI, Clarke TC, Barnes PM, Stussman BJ, Nahin RL (2015) Use of Complementary Health Approaches among Children Aged 4–17 Years in the United States: National Health Interview Survey, 2007–2012. *Natl Health Stat Report* 10:1–19.
24. Godfrey KM, Gallo LC, Afari N (2015) Mindfulness-Based Interventions for Binge Eating: A Systematic Review and Meta Analysis. *Journal of behavioral medicine*. 38: 348–362. [PubMed: 25417199]
25. Fogarty S, Harris D, Zaslawski C, McAinch AJ, Stojanovska L (2010) Acupuncture as an Adjunct Therapy in the Treatment of Eating Disorders: A Randomised Cross-over Pilot Study. *Complementary therapies in medicine*. 18: 233–240. [PubMed: 21130359]
26. Neumark-Sztainer D, Wall MM, Levine A, Barr-Anderson DJ, Eisenberg ME, et al. (2021) Yoga Practice among Ethnically/Racially Diverse Emerging Adults: Associations with Body Image, Mindful and Disordered Eating, and Muscle-Enhancing Behaviors. *The International Journal of Eating Disorders*. 54: 376–387. [PubMed: 33277727]
27. Perey I, Cook-Cottone C (2020) Eating Disorders, Embodiment, and Yoga: A Conceptual Overview. *Eating disorders*. 28: 315–329. [PubMed: 32964817]
28. Pacanowski CR, Diers L, Crosby RD, Mackenzie M, Neumark-Sztainer D (2020) Yoga’s Impact on Risk and Protective Factors for Disordered Eating: A Pilot Prevention Trial. *Eating disorders*. 28: 513–541. [PubMed: 32964818]
29. Kramer R, Cuccolo K (2020) Yoga Practice in a College Sample: Associated Changes in Eating Disorder, Body Image, and Related Factors over Time. *Eating disorders*. 28: 494–512. [PubMed: 31795842]
30. Diers L, Rydell SA, Watts A, Neumark-Sztainer D (2020) A Yoga-Based Therapy Program Designed to Improve Body Image among an Outpatient Eating Disordered Population: Program Description and Results from a Mixed-Methods Pilot Study. *Eating disorders*. 28: 476–493. [PubMed: 32421457]
31. Brennan MA, Whelton WJ, Sharpe D (2020) Benefits of Yoga in the Treatment of Eating Disorders: Results of a Randomized Controlled Trial. *Eating disorders*. 28: 438–457. [PubMed: 32182190]
32. Borden A, Cook-Cottone C (2020) Yoga and Eating Disorder Prevention and Treatment: A Comprehensive Review and Meta Analysis. *Eating disorders* 28: 400–437. [PubMed: 32964814]
33. Ruffault A, Carette C, Lurbe IPK, Juge N, Beauchet A, et al. (2016) Randomized Controlled Trial of a 12-Month Computerized Mindfulness-Based Intervention for Obese Patients with Binge Eating Disorder: The Mindob Study Protocol. *Contemp Clin Trials*. 49: 126–133. [PubMed: 27370231]
34. Woolhouse H, Knowles A, Crafti N (2012) Adding Mindfulness to Cbt Programs for Binge Eating: A Mixed-Methods Evaluation. *Eating disorders*. 20: 321–339. [PubMed: 22703573]
35. Sala M, Shankar Ram S, Vanzhula IA, Levinson CA (2020) Mindfulness and Eating Disorder Psychopathology: A Meta-Analysis. *The International Journal of Eating Disorders*. 53: 834–851. [PubMed: 32100320]
36. Giannopoulou I, Kotopoulea-Nikolaïdi M, Daskou S, Martyn K, Patel A (2020) Mindfulness in Eating Is Inversely Related to Binge Eating and Mood Disturbances in University Students in Health-Related Disciplines. *Nutrients*. 12: 396. [PubMed: 32024270]
37. Beccia AL, Ruf A, Druker S, Ludwig VU, Brewer JA (2020) Women’s Experiences with a Mindful Eating Program for Binge and Emotional Eating: A Qualitative Investigation into the Process of Change. *Journal of alternative and complementary medicine*. 26: 937–944. [PubMed: 32678712]
38. Pinto-Gouveia J, Carvalho SA, Palmeira L, Castilho P, Duarte C, et al. (2019) Incorporating Psychoeducation, Mindfulness and Self-Compassion in a New Programme for Binge Eating (Befree): Exploring Processes of Change. *J Health Psychol* 24: 466–479. [PubMed: 27852886]
39. Warren JM, Smith N, Ashwell M (2017) A Structured Literature Review on the Role of Mindfulness, Mindful Eating and Intuitive Eating in Changing Eating Behaviours: Effectiveness and Associated Potential Mechanisms. *Nutr Res Rev* 30: 272–283. [PubMed: 28718396]

40. Pinto-Gouveia J, Carvalho SA, Palmeira L, Castilho P, Duarte C, et al. (2017) Befree: A New Psychological Program for Binge Eating That Integrates Psychoeducation, Mindfulness, and Compassion. *Clin Psychol Psychother* 24: 1090–1098. [PubMed: 28124451]
41. Linardon J, Fairburn CG, Fitzsimmons-Craft EE, Wilfley DE, Brennan L (2017) The Empirical Status of the Third-Wave Behaviour Therapies for the Treatment of Eating Disorders: A Systematic Review. *Clin Psychol Rev* 58:125–140. [PubMed: 29089145]
42. Vancampfort D, Vanderlinden J, De Hert M, Adámkova M, Skjaerven LH, et al. (2013) A Systematic Review on Physical Therapy Interventions for Patients with Binge Eating Disorder. *Disabil Rehabil* 35: 2191–2196. [PubMed: 23594056]
43. Díaz-Marsá M, Alberdi-Páramo I, Niell-Galmés L (2017) Nutritional Supplements in Eating Disorders. *Actas espanolas de psiquiatria* 45: 26–36. [PubMed: 29171644]
44. Navarro-Tapia E, Almeida-Toledano L, Sebastiani G, Serra-Delgado M, García-Algar Ó, et al. (2021) Effects of Microbiota Imbalance in Anxiety and Eating Disorders: Probiotics as Novel Therapeutic Approaches. *International journal of molecular sciences* 22: 2351. [PubMed: 33652962]
45. Ostermann T, Vogel H, Boehm K, Cramer H (2019) Effects of Yoga on Eating Disorders-a Systematic Review. *Complementary therapies in medicine*. 46: 73–80. [PubMed: 31519291]
46. Greenblatt J (2020) Functional & Integrative Medicine for Binge-Eating Disorder.: *Comprehensive Psychiatric*.
47. Greenblatt J, Ross-Taylor V (2019) Integrative Medicine for Binge Eating: A Comprehensive Guide to the New Hope Model for the Elimination of Binge Eating and Food Cravings.
48. Douglass L (2010) Thinking through the Body: The Conceptualization of Yoga as Therapy for Individuals with Eating Disorders. *Eating disorders*. 19: 83–96.
49. McIver S, McGartland M, O'Halloran P (2009) “Overeating Is Not About the Food”: Women Describe Their Experience of a Yoga Treatment Program for Binge Eating. *Qual Health Res* 19:1234–1245. [PubMed: 19690205]
50. McIver S, O'Halloran P, McGartland M (2009) Yoga as a Treatment for Binge Eating Disorder: A Preliminary Study. *Complementary therapies in medicine*. 17:196–202. [PubMed: 19632546]
51. Kristeller JL, Hallett CB (1999) An Exploratory Study of a Meditation-Based Intervention for Binge Eating Disorder. *J Health Psychol* 4: 357–363. [PubMed: 22021603]
52. Braun V, Clarke V (2006) Using Thematic Analysis in Psychology. *Qualitative Research in Psychology*. 3: 77–101.
53. Braun V, Clarke V (2021) One Size Fits All? What Counts as Quality Practice in (Reflexive) Thematic Analysis?. *Qualitative Research in Psychology*. 18:328–352.
54. Bray B, Bray C, Bradley R, Zwickey H (2022) Binge Eating Disorder Is a Social Justice Issue: A Cross-Sectional Mixed-Methods Study of Binge Eating Disorder Experts' Opinions. *Int J Environ Res Public Health* 19: 6243. [PubMed: 35627779]
55. Bray B, Sadowski A, Bray C, Bradley R, Zwickey H (2023) Clinical Aspects of Binge Eating Disorder: A Cross-Sectional Mixed Methods Study of Binge Eating Disorder Experts' Perspectives. *Frontiers in psychiatry*. 13:1087165.
56. Wilkinson S (2000) Women with Breast Cancer Talking Causes: Comparing Content, Biographical and Discursive Analyses. *Feminism & Psychology*. 10: 431–460.
57. Ryan GW, Bernard HR (2000) Data Management and Analysis Methods. *Handbook of qualitative research* 2: 769–802.
58. Levitt HM, Bamberg M, Creswell JW, Frost DM, Josselson R, et al. (2018) Journal Article Reporting Standards for Qualitative Primary, Qualitative Meta-Analytic, and Mixed Methods Research in Psychology: The Apa Publications and Communications Board Task Force Report. *American Psychologist*. 73: 26–46. [PubMed: 29345485]
59. Linardon J, Gleeson J, Yap K, Murphy K, Brennan L (2019) Meta-Analysis of the Effects of Third-Wave Behavioural Interventions on Disordered Eating and Body Image Concerns: Implications for Eating Disorder Prevention. *Cogn Behav Ther* 48: 15–38. [PubMed: 30307377]
60. Ostermann T, Vogel H, Starke C, Cramer H (2019) Effectiveness of Yoga in Eating Disorders - a Case Report. *Complementary therapies in medicine*. 42:145–148. [PubMed: 30670233]
61. Binge Eating: A Transdiagnostic Psychopathology. Switzerland: Springer Nature (2021).

62. Micozzi MS (2019) *Fundamentals of Complementary, Alternative, and Integrative Medicine*, Sixth Edition. Elsevier.
63. Agne A, Quesnel DA, Larumbe-Zabala E, Olmedillas H, Graell-Berna M, et al. (2022) Progressive Resistance Exercise as Complementary Therapy Improves Quality of Life and Body Composition in Anorexia Nervosa: A Randomized Controlled Trial. *Complementary therapies in clinical practice*. 48: 101576.
64. Fogarty S, Smith CA, Touyz S, Madden S, Buckett G, et al. (2013) Patients with Anorexia Nervosa Receiving Acupuncture or Acupressure; Their View of the Therapeutic Encounter. *Complementary therapies in medicine*. 21:675–681. [PubMed: 24280477]
65. Foroughi N, Zhu KCY, Smith C, Hay P (2019) The Perceived Therapeutic Benefits of Complementary Medicine in Eating Disorders. *Complementary therapies in medicine*. 43: 176–180. [PubMed: 30935527]
66. Godsey J (2013) The Role of Mindfulness Based Interventions in the Treatment of Obesity and Eating Disorders: An Integrative Review. *Complementary therapies in medicine*. 21: 430–439. [PubMed: 23876574]
67. Martínez-Sánchez SM, Martínez-García TE, Bueno-Antequera J, Munguía-Izquierdo D (2020) Feasibility and Effect of a Pilates Program on the Clinical, Physical and Sleep Parameters of Adolescents with Anorexia Nervosa. *Complementary therapies in clinical practice*. 39:101161.
68. Sojcher R, Gould Fogerite S, Perlman A (2012) Evidence and Potential Mechanisms for Mindfulness Practices and Energy Psychology for Obesity and Binge-Eating Disorder. *Explore (NY)*. 8: 271–276. [PubMed: 22938745]
69. Bray B, Rodríguez-Martín BC, Wiss DA, Bray CE, Zwickey H (2021) Overeaters Anonymous: An Overlooked Intervention for Binge Eating Disorder. *International Journal of Environmental Research and Public Health*. 18: 7303. [PubMed: 34299752]
70. Rodríguez-Martín BC, Martín-García M, Martínez-Infiesta I, Souied-Espada A, de La Cruz-Medina P (2020) Treating Anorexia as Addiction: A Case Study with 2-Years of Follow-Up. *Journal of Psychiatry and Psychiatric Disorders*. 4: 94–100.
71. Rodríguez-Martín BC, Gallego-Arjiz B (2018) Overeaters Anonymous: A Mutual-Help Fellowship for Food Addiction Recovery. *Frontiers in psychology*. 9: 1491. [PubMed: 30177901]
72. Neumark-Sztainer D, MacLehose RF, Watts AW, Pacanowski CR, Eisenberg ME (2018) Yoga and Body Image: Findings from a Large Population-Based Study of Young Adults. *Body Image*. 24: 69–75. [PubMed: 29288970]
73. Poddar KH, Hosig KW, Anderson ES, Nickols-Richardson SM, Duncan SE (2010) Web-Based Nutrition Education Intervention Improves Self-Efficacy and Self-Regulation Related to Increased Dairy Intake in College Students. *J Am Diet Assoc* 110: 1723–1727. [PubMed: 21034887]
74. Johnson PJ, Jou J, Rockwood TH, Upchurch DM (2019) Perceived Benefits of Using Complementary and Alternative Medicine by Race/Ethnicity among Midlife and Older Adults in the United States. *J Aging Health*. 31: 1376–1397. [PubMed: 29900809]
75. Bray B, Sadowski A, Mist S, Quaglia J, Shallcross A, et al. (2024) Complementary and Integrative Health Use in Binge Eating Disorder: A Narrative Review. In Prep.
76. Cifani C, Micioni Di Bonaventura MV, Vitale G, Ruggieri V, Ciccocioppo R, et al. (2010) Effect of Salidroside, Active Principle of *Rhodiola Rosea* Extract, on Binge Eating. *Physiology & behavior*. 101: 555–562. [PubMed: 20837037]
77. Lavretsky H (2017) Complementary, Alternative, and Integrative Medicine Use Is Rising among Aging Baby Boomers. *The American Journal of Geriatric Psychiatry*. 25: 1402–1403. [PubMed: 28939285]
78. Clarke TC, Barnes PM, Black LI, Stussman BJ, Nahin RL (2018) Use of Yoga, Meditation, and Chiropractors among U.S. Adults Aged 18 and Over. *NCHS Data Brief*. 325: 1–8.
79. Varteresian T, Lavretsky H (2018) Complementary and Integrative Therapies in Psychiatry. *Focus (Am Psychiatr Publ)*.
80. Fairburn CG, Cooper Z, Shafran R (2003) Cognitive Behaviour Therapy for Eating Disorders: A “Transdiagnostic” Theory and Treatment. *Behaviour research and therapy*. 41: 509–528. [PubMed: 12711261]

81. Kabat-Zinn J, Hanh TN (2009) Full Catastrophe Living: Using the Wisdom of Your Body and Mind to Face Stress, Pain, and Illness: Delta.
82. Bishop SR, Lau M, Shapiro S, Carlson L, Anderson ND, et al. (2004) Mindfulness: A Proposed Operational Definition. *Clinical psychology: Science and practice*. 11: 230–241.
83. Astin JA (1998) Why Patients Use Alternative Medicine: Results of a National Study. *Jama*. 279: 1548–1553. [PubMed: 9605899]
84. Brownley KA, Berkman ND, Peat CM, Lohr KN, Cullen KE, et al. (2016) Binge-Eating Disorder in Adults: A Systematic Review and Meta-Analysis. *Annals of internal medicine*. 165: 409–420. [PubMed: 27367316]
85. Lao L, Ezzo J, Berman BM, Hammerschlag R (2001) Assessing Clinical Efficacy of Acupuncture: Considerations for Designing Future Acupuncture Trials. Springer Berlin Heidelberg. 187–209.
86. Witt CM, Aickin M, Baca T, Cherkin D, Haan MN, et al. (2012) Effectiveness Guidance Document (Egd) for Acupuncture Research—a Consensus Document for Conducting Trials. *BMC complementary and alternative medicine*. 6: 148.
87. Striegel-Moore RH, Rosselli F, Holtzman N, Dierker L, Becker AE, et al. (2011) Behavioral Symptoms of Eating Disorders in Native Americans: Results from the Add Health Survey Wave Iii. *The International journal of eating disorders*. 44: 561–566. [PubMed: 21823140]
88. Perez M, Ramirez AL, Trujillo-ChiVacuán E (2019) An Introduction to the Special Issue on the State of the Art Research on Treatment and Prevention of Eating Disorders on Ethnic Minorities. *Eating disorders*. 27: 101–109. [PubMed: 30849292]
89. Lydecker JA, Grilo CM (2016) Different yet Similar: Examining Race and Ethnicity in Treatment-Seeking Adults with Binge Eating Disorder. *Journal of consulting and clinical psychology*. 84: 88–94. [PubMed: 26348841]
90. Castle Connolly Top Doctors.
91. AED AfED. About Aed: Honors & Awards.
92. AND AoNaD. Academy of Nutrition and Dietetics Leadership.
93. AED AfED. Academy for Eating Disorders Leadership.
94. FAED AfEDF. Academy for Eating Disorder Fellows.
95. ASMBS TASfMBS. American Society for Metabolic and Bariatric Surgery Executive Council.
96. BHN BHNadpotAoNaD. (2022) Behavioral Health Nutrition. Executive Committee 2021–2022.
97. EDRS EDRS. Eating Disorder Research Society Board of Directors.
98. IAEDP IAoEDP. International Association of Eating Disorders Providers (Iaedp) Foundation Membership.
99. Johns Hopkins 2020 Eating Disorders Conference Faculty.
100. NCEED NCoEfED. National Center of Excellence for Eating Disorders (Nceed) Leadership Team.
101. 101.NEDA NEDA. National Eating Disorder Association (Neda) Advisors.
102. TOS. The Obesity Society Governing Board.
103. (NEDA) (2018) NEDA. Neda Treatment Providers.
104. Disorders NAFe (2022) Treatment Center & Practitioner Directory <https://finedhelp.com>: National Alliance for Eating Disorders.
105. Goode E (2016) Centers to Treat Eating Disorders Are Growing, and Raising Concerns. *The New York Times*.
106. Linardon J (2021) 15 Best Eating Disorder Books of All-Time to Improve Your Eating Behaviors. *BreakBingeEating.com* [Internet]. (2021 8–15,).
107. Kondo T, Kawamoto M (2014) Acupuncture and Moxibustion for Stress-Related Disorders. *Biopsychosoc Med* 8: 7. [PubMed: 24456818]
108. Mitchell KS, Mazzeo SE, Rausch SM, Cooke KL (2007) Innovative Interventions for Disordered Eating: Evaluating Dissonance Based and Yoga Interventions. *International Journal of Eating Disorders*. 40: 120–128. [PubMed: 17089413]
109. Hopkins LB, Medina JL, Baird SO, Rosenfield D, Powers MB, et al. (2016) Heated Hatha Yoga to Target Cortisol Reactivity to Stress and Affective Eating in Women at Risk for Obesity-

- Related Illnesses: A Randomized Controlled Trial. *Journal of consulting and clinical psychology*. 84: 558–564. [PubMed: 26963599]
110. Micioni Di Bonaventura MV, Vitale G, Massi M, Cifani C (2012) Effect of Hypericum Perforatum Extract in an Experimental Model of Binge Eating in Female Rats. *J Obes* 2012: 956137.
 111. Smith KE, Mason TB, Anderson LM, Schaefer LM, Crosby RD, et al. (2020) Naturalistically Assessed Associations between Physical Activity, Affective Functioning, and Binge Eating among Adults with Binge-Eating Disorder. *Eating disorders*. 154–167. [PubMed: 32397943]
 112. Grohmann D, Laws KR (2021) Two Decades of Mindfulness-Based Interventions for Binge Eating: A Systematic Review and Meta-Analysis. *Journal of psychosomatic research*. 149: 110592.
 113. Fogarty S, Stojanovska L, Harris D, Zaslawski C, Mathai ML, et al. (2015) A Randomised Cross-over Pilot Study Investigating the Use of Acupuncture to Promote Weight Loss and Mental Health in Overweight and Obese Individuals Participating in a Weight Loss Program. *Eating and weight disorders*. 20: 379–387. [PubMed: 25630840]
 114. Mantle F (1996) Complementary Therapy. A Taste of Health. *Nurs Times* 92: 50–51. [PubMed: 8718036]
 115. Read A, Beaty P, Corner J, Sommerville Ville C (1996) Reducing Naltrexone-Resistant Hyperphagia Using Laser Acupuncture to Increase Endogenous Opiates. *Brain Inj* 10: 911–919. [PubMed: 8939309]
 116. Högberg G (1998) [Is Electroacupuncture Effective in Anorexia and Bulimia?]. *Lakartidningen* 95: 4963. [PubMed: 9835706]
 117. Kim EH, Kim Y, Jang MH, Lim BV, Kim YJ, et al. (2001) Auricular Acupuncture Decreases Neuropeptide Y Expression in the Hypothalamus of Food-Deprived Sprague-Dawley Rats. *Neuroscience letters*. 307: 113–116. [PubMed: 11427313]
 118. Kim SK, Lee G, Shin M, Han JB, Moon HJ, et al. (2006) The Association of Serum Leptin with the Reduction of Food Intake and Body Weight During Electroacupuncture in Rats. *Pharmacology, biochemistry, and behavior*. 83: 145–149 [PubMed: 16497365]
 119. Tian N, Wang F, Tian DR, Zou Y, Wang SW, et al. (2006) Electroacupuncture Suppresses Expression of Gastric Ghrelin and Hypothalamic Npy in Chronic Food Restricted Rats. *Peptides*. 27: 2313–2320. [PubMed: 16644064]
 120. Kim SK, Kim J, Woo HS, Jeong H, Lee H, et al. (2010) Electroacupuncture Induces Fos Expression in the Nucleus Tractus Solitarius Via Cholecystokinin a Receptor Signaling in Rats. *Neurol Res* 32: 116–119. [PubMed: 20034459]
 121. Yao H, Chen JX, Zhang ZQ, Pan Y, Zheng J, et al. (2012) [Effect of Acupuncture Therapy on Appetite of Obesity Patients]. *Zhen Ci Yan Jiu* 37: 497–501. [PubMed: 23383461]
 122. Ji B, Hu J, Ma S (2013) Effects of Electroacupuncture Zusanli (St36) on Food Intake and Expression of Pomc and Trpv1 through Afferents-Medulla Pathway in Obese Prone Rats. *Peptides*. 40:188–194. [PubMed: 23116614]
 123. Smith C, Fogarty S, Touyz S, Madden S, Buckett G, et al. (2014) Acupuncture and Acupressure and Massage Health Outcomes for Patients with Anorexia Nervosa: Findings from a Pilot Randomized Controlled Trial and Patient Interviews. *Journal of alternative and complementary medicine (New York, NY)*. 20: 103–112.
 124. Wang SQ, Zhang WL (2014) [Case of Polyorexia]. *Zhongguo Zhen Jiu* 34: 883. [PubMed: 25509740]
 125. Fogarty S, Ramjan LM (2015) Practice Guidelines for Acupuncturists Using Acupuncture as an Adjunctive Treatment for Anorexia Nervosa. *Complementary therapies in medicine*. 23:14–22. [PubMed: 25637148]
 126. Jing XY, Ou C, Lu SF, Zhu BM (2015) [Acupuncture Intervention Reduced Weight Gain Induced by Hypoglycemic Agents through Food Intake-Related Targets in Central Nervous System]. *Zhen Ci Yan Jiu* 40: 510–513. [PubMed: 26887217]
 127. Hedlund S, Landgren K (2017) Creating an Opportunity to Reflect: Ear Acupuncture in Anorexia Nervosa - Inpatients' Experiences. *Issues Ment Health Nurs* 38: 549–556. [PubMed: 28394647]

128. Namazi N, Khodamoradi K, Larijani B, Ayati MH (2017) Is Laser Acupuncture an Effective Complementary Therapy for Obesity Management? A Systematic Review of Clinical Trials. *Acupunct Med* 35:452–459. [PubMed: 29074473]
129. Chen JA, Chen JA, Lee S, Mullin G (2018) Potential Role for Acupuncture in the Treatment of Food Addiction and Obesity. *Acupunct Med* 36: 52–55. [PubMed: 29223953]
130. Bishop FL, Lauche R, Cramer H, Pinto JW, Leung B, et al. (2019) Health Behavior Change and Complementary Medicine Use: National Health Interview Survey 2012. *Medicina (Kaunas)*. 55: 632. [PubMed: 31554323]
131. Zhang X, Chen H, Val-Laillet D (2020) Hypothesis Paper: Electroacupuncture Targeting the Gut-Brain Axis to Modulate Neurocognitive Determinants of Eating Behavior-toward a Proof of Concept in the Obese Minipig Model. *Eating and weight disorders*.
132. Ahlberg R, Skärberg K, Brus O, Kjellin L (2016) Auricular Acupuncture for Substance Use: A Randomized Controlled Trial of Effects on Anxiety, Sleep, Drug Use and Use of Addiction Treatment Services. *Substance abuse treatment, prevention, and policy*. 11: 24. [PubMed: 27451854]
133. Baker TE, Chang G (2016) The Use of Auricular Acupuncture in Opioid Use Disorder: A Systematic Literature Review. *The American journal on addictions*. 25: 592–602. [PubMed: 28051842]
134. Bergdahl L, Berman AH, Haglund K (2014) Patients' Experience of Auricular Acupuncture During Protracted Withdrawal. *J Psychiatr Ment Health Nurs* 21: 163–169. [PubMed: 23230968]
135. Black S, Carey E, Webber A, Neish N, Gilbert R (2011) Determining the Efficacy of Auricular Acupuncture for Reducing Anxiety in Patients Withdrawing from Psychoactive Drugs. *Journal of substance abuse treatment*. 41: 279–287. [PubMed: 21632199]
136. Carter K, Olshan-Perlmutter M (2014) Nada Protocol: Integrative Acupuncture in Addictions. *J Addict Nurs* 25: 182–187. [PubMed: 25514687]
137. Carter K, Olshan-Perlmutter M (2015) Impulsivity and Stillness: Nada, Pharmaceuticals, and Psychotherapy in Substance Use and Other Dsm 5 Disorders. *Behav Sci (Basel)* 5: 537–546. [PubMed: 26703743]
138. Carter K, Olshan-Perlmutter M, Marx J, Martini JF, Cairns SB (2017) Nada Ear Acupuncture: An Adjunctive Therapy to Improve and Maintain Positive Outcomes in Substance Abuse Treatment. *Behav Sci (Basel)* 7: 32. [PubMed: 28498355]
139. Cui CL, Wu LZ, Li YJ (2013) Acupuncture for the Treatment of Drug Addiction. *International review of neurobiology*. 111: 235–256. [PubMed: 24215926]
140. Cui CL, Wu LZ, Luo F (2008) Acupuncture for the Treatment of Drug Addiction. *Neurochemical research*. 33: 2013–2022. [PubMed: 18618246]
141. Cui CL, Wu LZ, Luo F, Han JS (2008) [Acupuncture for the Treatment of Drug Addiction]. *Sheng Li Ke Xue Jin Zhan* 39: 325–330. [PubMed: 19119614]
142. D'Alberty A (2004) Auricular Acupuncture in the Treatment of Cocaine/Crack Abuse: A Review of the Efficacy, the Use of the National Acupuncture Detoxification Association Protocol, and the Selection of Sham Points. *Journal of alternative and complementary medicine*. 10: 985–1000. [PubMed: 15673993]
143. Leung L, Neufeld T, Marin S (2012) Effect of Self-Administered Auricular Acupressure on Smoking Cessation--a Pilot Study. *BMC complementary and alternative medicine*. 12: 11. [PubMed: 22373002]
144. Oyola-Santiago T, Knopf R, Robin T, Harvey K (2013) Provision of Auricular Acupuncture and Acupressure in a University Setting. *J Am Coll Health* 61: 432–434. [PubMed: 24010498]
145. Stuyt EB, Voyles CA (2016) The National Acupuncture Detoxification Association Protocol, Auricular Acupuncture to Support Patients with Substance Abuse and Behavioral Health Disorders: Current Perspectives. *Substance abuse and rehabilitation*. 7:169–180. [PubMed: 27994492]
146. Stuyt EB, Voyles CA, Bursac S (2018) Nada Protocol for Behavioral Health. Putting Tools in the Hands of Behavioral Health Providers: The Case for Auricular Detoxification Specialists. *Medicines (Basel)*. 5: 20. [PubMed: 29414848]

147. Chamberlin DE (2019) The Predictive Processing Model of EMDR. *Frontiers in psychology* 10: 2267. [PubMed: 31636594]
148. Sciarrino NA, Warnecke AJ, Teng EJ (2020) A Systematic Review of Intensive Empirically Supported Treatments for Posttraumatic Stress Disorder. *J Trauma Stress* 33: 443–454. [PubMed: 32598561]
149. Bray B, Shallcross A, Sadowski A, Schneller M, Bray C, Zwickey H (2024) Complementary and Integrative Health Use in Binge Eating Disorder: A Cross-Sectional Mixed-Methods Study of Binge Eating Disorder Experts' Perspectives. *International Journal of Nursing and Health Care Research*, 07: 05.
150. Nhất Hạnh T (1987) *The Miracle of Mindfulness: A Manual on Meditation*: Revised edition. Boston: Beacon Press.
151. Kabat-Zinn J (2023) *About Jon Kabat-Zinn*.
152. Aggithaya MG, Narahari SR, Vayalil S, Shefuvan M, Jacob NK, et al. (2013) Self Care Integrative Treatment Demonstrated in Rural Community Setting Improves Health Related Quality of Life of Lymphatic Filariasis Patients in Endemic Villages. *Acta Trop*. 126: 198–204. [PubMed: 23499714]
153. Garcia MG, Estrella M, Peñafiel A, Arauz PG, Martin BJ (2021) Impact of 10-Min Daily Yoga Exercises on Physical and Mental Discomfort of Home-Office Workers During Covid-19. *Human Factors*. 65: 001872082110457.
154. Hishikawa N, Takahashi Y, Fukui Y, Tokuchi R, Furusawa J, et al. (2019) Yoga-Plus Exercise Mix Promotes Cognitive, Affective, and Physical Functions in Elderly People. *Neurol Res* 41: 1001–1007. [PubMed: 31588880]
155. Innes KE, Selfe TK, Montgomery C, Hollingshead N, Huysmans Z, et al. (2020) Effects of a 12-Week Yoga Versus a 12-Week Educational Film Intervention on Symptoms of Restless Legs Syndrome and Related Outcomes: An Exploratory Randomized Controlled Trial. *J Clin Sleep Med* 16: 107–119. [PubMed: 31957638]
156. Lai KSP, Watt C, Ionson E, Baruss I, Forchuk C, et al. (2020) Breath Regulation and Yogic Exercise an Online Therapy for Calm and Happiness (Breath) for Frontline Hospital and Long-Term Care Home Staff Managing the Covid-19 Pandemic: A Structured Summary of a Study Protocol for a Feasibility Study for a Randomised Controlled Trial. *Trials*. 21: 648. [PubMed: 32665041]
157. Lazaridou A, Koulouris A, Devine JK, Haack M, Jamison RN, et al. (2019) Impact of Daily Yoga-Based Exercise on Pain, Catastrophizing, and Sleep Amongst Individuals with Fibromyalgia. *J Pain Res* 12: 2915–2923. [PubMed: 31802932]
158. McKinney A (2020) Determinants of Maintaining a Daily Yoga Practice: Health Locus of Control and Self-Determination Theory Perspective. *Int J Yoga* 13: 193–199. [PubMed: 33343148]
159. Prakash K, Saini SK, Pugazhendi S (2020) Effectiveness of Yoga on Quality of Life of Breast Cancer Patients Undergoing Chemotherapy: A Randomized Clinical Controlled Study. *Indian J Palliat Care* 26: 323–331. [PubMed: 33311874]
160. Shahrbanian S, Alikhani S, Ahmadi Kakavandi M, Hackney AC (2020) Physical Activity for Improving the Immune System of Older Adults During the Covid-19 Pandemic. *Alternative therapies in health and medicine* 26: 117–125. [PubMed: 33245704]
161. Thirthalli J, Naveen GH, Rao MG, Varambally S, Christopher R, et al. (2013) Cortisol and Antidepressant Effects of Yoga. *Indian J Psychiatry*. 55: S405–S408. [PubMed: 24049209]
162. Wolff M, Rogers K, Erdal B, Chalmers JP, Sundquist K, et al. (2016) Impact of a Short Home-Based Yoga Programme on Blood Pressure in Patients with Hypertension: A Randomized Controlled Trial in Primary Care. *J Hum Hypertens* 30: 599–605. [PubMed: 26791478]
163. Yu N, Huang YT (2020) Important Factors Affecting User Experience Design and Satisfaction of a Mobile Health App—a Case Study of Daily Yoga App. *Int J Environ Res Public Health* 17: 6967. [PubMed: 32977635]
164. Open AI. (2021) How Much Does an Initial Intake Acupuncture Session Cost on Average? [Response to User Query].
165. OpenAI. (2021) How Much Does Acupuncture Cost on Average? [Response to User Query].

166. Austin S, Ramamonjirivelo Z, Qu H, Ellis-Griffith G (2015) Acupuncture Use in the United States: Who, Where, Why, and at What Price?. *Health marketing quarterly* 32: 113–128. [PubMed: 26075541]
167. Bleck R, Marquez E, Gold MA, Westhoff CL (2021) A Scoping Review of Acupuncture Insurance Coverage in the United States. *Acupuncture in Medicine*. 39: 461–470. [PubMed: 33307728]
168. Candon M, Nielsen A, Dusek JA (2022) Trends in Insurance Coverage for Acupuncture, 2010–2019. *JAMA Network Open* 5: e2142509.
169. Fan AY (2014) “Obamacare” Covers Fifty-Four Million Americans for Acupuncture as Essential Healthcare Benefit. *Journal of integrative medicine*. 12: 390–393. [PubMed: 25074889]
170. Zhenhai Y, Lihong L (2020) *The Yellow Emperor’s Inner Transmission of Acupuncture*. Hong Kong: The Chinese University of Hong Kong Press.
171. Ni M (1995) *The Yellow Emperor’s Classic of Medicine: A New Translation of the Neijing Suwen with Commentary*. Boston and London: Shambhala Publications.
172. Motlagh FE, Ibrahim F, Rashid RA, Seghatoleslam T, Habil H (2016) Acupuncture Therapy for Drug Addiction. *Chinese Medicine*. 11: 16. [PubMed: 27053944]
173. OpenAI. (2021) What Is the Average Cost of a Community/Group Acupuncture Session? [Response to User Query].
174. Kim D, Ham OK, Kang C, Jun E (2014) Effects of Auricular Acupressure Using Sinapsis Alba Seeds on Obesity and Self-Efficacy in Female College Students. *Journal of alternative and complementary medicine*. 20: 258–264. [PubMed: 24070326]
175. Yasemin C, Turan S, Kosan Z (2017) The Effects of Auricular and Body Acupuncture in Turkish Obese Female Patients: A Randomized Controlled Trial Indicated Both Methods Lost Body Weight but Auricular Acupuncture Was Better Than Body Acupuncture. *Acupunct Electrother Res* 42: 1–10. [PubMed: 29772131]
176. Hilbert A, Petroff D, Herpertz S, Pietrowsky R, Tuschen-Caffier B, Vocks S, et al. Meta-Analysis of the Efficacy of Psychological and Medical Treatments for Binge-Eating Disorder. *Journal of consulting and clinical psychology* (2019) 87(1):91–105. Epub 2018/12/21. doi: 10.1037/ccp0000358. [PubMed: 30570304]
177. Kenny TE, Carter JC, Safer DL. Dialectical Behavior Therapy Guided Self-Help for Binge-Eating Disorder. *Eating disorders* (2020) 28(2):202–11. Epub 2019/10/18. doi: 10.1080/10640266.2019.1678982. [PubMed: 31619136]
178. Carter JC, Kenny TE, Singleton C, Van Wijk M, Heath O. Dialectical Behavior Therapy Self-Help for Binge-Eating Disorder: A Randomized Controlled Study. *The International journal of eating disorders* (2020) 53(3):451–60. Epub 2019/12/11. doi: 10.1002/eat.23208. [PubMed: 31821592]

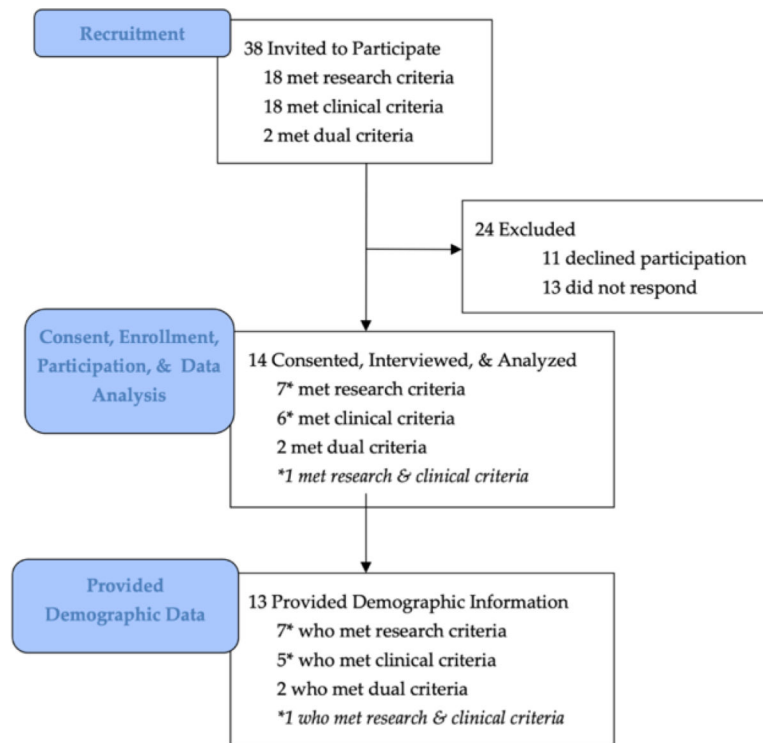


Figure 1:

Diagram of study flow, from participant identification to enrollment and follow-up. Thirty-eight experts met enrollment criteria and were invited to participate in the study. This included 18 experts who met the academic/research criteria (18/38, 47%), 18 experts who met the clinical criteria (18/38, 47%), and two who met the dual criteria (2/38, 5%; Table 1). Fourteen eligible experts consented, enrolled, and participated in the study (14/38, 37%), including six individuals who met the academic/research criteria (6/14, 43%), five who met the clinical criteria (5/14, 36%), one who met both the academic/research and clinical criteria (1/14, 7%), and two who met the dual criteria option (2/14, 14%) (Table 3). Thirteen participants (13/14, 93%) provided demographic information and were included in demographic analysis (Table 3). All 14 participant interviews were included in thematic analysis. Figure reproduced from [15,54,55] with authors' permissions.

Table 1.

Participant Eligibility Criteria

Eligibility Criteria for Researchers (18 Recruited, 7 Enrolled)
I. Eligibility criteria for researchers required meeting one of the following four criteria:
a. 1 active R01, T32, or P grant on binge eating or food addiction as identified on NIH RePORTER (https://report.nih.gov).
b. Last author of 10 PubMed-indexed publications published 2010–2020 on adult BED AND 5 PubMed-indexed publications in 2015–2020 on the same topic.
c. Last author of 5 PubMed publications published in 2015–2020 relevant to food addiction. ^a
d. Referral from someone who meets one of the qualifications above (I.1–3).
Eligibility Criteria for Clinicians and Healthcare Administrators (18 Recruited, 6 Enrolled)
II. Eligibility for clinicians and healthcare administrators required meeting 3 of the following criteria:
a. Award Winner or Honoree of the Academy of Eating Disorders (AED, 2010–2020) or the Castle Connolly Top Doctors Distinction in Psychiatry – Eating Disorders (2020/21)[93,94].
b. Executive position/board member for one of ten relevant societies: Academy of Nutrition & Dietetics, Academy of Eating Disorders (AED, FAED), American Society for Metabolic and Bariatric Surgery (ASMBS), Behavioral Health Nutrition Society, Eating Disorder Research Society (EDRS), International Association of Eating Disorder Providers (IAEDP), Johns Hopkins 2020 Eating Disorders Conference, National Center of Excellence for Eating Disorders (NCEED), National Eating Disorder Association (NEDA), Obesity Society [95–105].
c. Adult BED provider listed in the NEDA– or Alliance for Eating Disorders Awareness Provider Directories [106,107] or associated with an eating disorder program or treatment center with 5 locations listed in the NEDA directory [106].
d. Popular press distinction [108,109].
e. Referral from an individual meeting 2 qualifications above.
f. Registered Dietician (RD) meeting 2 criteria above.
Additional Eligibility Criteria (2 Recruited, 2 Enrolled)^b
Individuals who met 1 academic/research criterion (I) and 1 clinical criterion (II) were also eligible.

^aThis criterion required 5 publications in the past five years because of the relative newness of the concept of food addiction.

^bBoth participants each met two academic/research criteria and two clinician/healthcare administrator criteria. Table reproduced from [9,15,54,55] with authors' permissions.

Abbreviations: AED, Academy of Eating Disorders; BED, binge eating disorder; CIH, complementary and integrative health; ED, eating disorder; FAED, Academy of Eating Disorders Fellowship/Fellow; NEDA, National Eating Disorder Association; NIH, United States of America National Institute of Health; P, Program Project and Center Grant; R01, Research Project Grant; T32, Institutional National Research Service Award (NRSA) for Training Programs.

Table 2.

Interview Questions Pertaining to CIH Use in Adult BED Management and Care

Interview Questions Pertaining to CIH Use in Adult BED Management and Care	n asked (n/14)
a. Please describe your perspective on (or knowledge of) literature and research, current clinical guidelines, and your own personal (professional) experiences relating to current complementary and integrative health (CIH) treatment interventions utilized and/or considered for clinical care and treatment of adult BED.	14 (100%)
b. Do you have any other thoughts or opinions on CIH use in the context of adult BED that you would like to voice?	14 (100%)
c. Please describe your perspective on current research gaps that exist in the field of BED.	14 (100%)

Results expressed as n (%). n = number participants asked. Percentages expressed as n/14 times 100.

Abbreviations: BED, binge eating disorder; CIH, complementary and integrative health; n, number of participants who responded to the question.

Table 3.

Characteristics of the 13/14 Study Participants who Provided Demographic Data

Demographic Criteria	n asked (n/14)
I. Eligibility Criteria Met	
a. Research/Academic	6 (43%)
b. Clinical/Administrative	5 (36%)
c. Both (Research/Academic AND Clinical/Administrative)	1 (7%)
d. Combined (1 Research/Academic and 1 Clinical Administrative)	2 (14%)
II. Credentials	
a. Doctor of Philosophy (PhD) or Science (ScD)	8 (62%)
b. Medical Doctor (MD)	4 (31%)
c. Licensed or Registered Dietician (LD/RD) or RD Certified in Eating Disorders (CEDRD)	4 (31%)
d. Bachelor of Medicine Chirurgical Doctor (Bachelor of Surgery) (B\MBChB)	1 (8%)
e. Master's in Public Health (MPH)	1 (8%)
III. Accreditations & Accolades	
a. Fellow of the Academy of Eating Disorders (FAED)	8 (62%)
b. Healthcare Administrator	2 (15%)
c. Certified Chef	1 (8%)
d. Certified Intuitive Eating Specialist (CIES)	1 (8%)
e. Fellow of the American College of Neuropsychopharmacology (FACNP)	1 (8%)
f. Masters in Public Health (MPH)	1 (8%)
IV. Sex Assigned at Birth	
a. Female	8 (62%)
b. Male	5 (38%)
c. Other	0 (0%)
V. Sex/Gender Identity at the Time of the Study	
This demographic information is highly relevant, given the disproportionately high risk and prevalence rates of BED among sex and gender minorities, including men and members of the LGBTQ2+ community [see discussion and citations in Bray et al., 2021]. However, this demographic information was regrettably not collected for this study, as addressed in section 4.4 below.	
VI. Age	
a. 55 ± 10.2 years (range: 37 – 44 yrs., n = 13)	
VII. Ethnicity	
a. Hispanic or Latino	0 (0%)
b. Not Hispanic or Latino	13(100%)
VIII. Race	
a. American Indian or Alaska Native	0 (0%)
b. Asian	1 (8%)
c. Black or African American	0 (0%)
d. Native Hawaiian or Other Pacific Islander	0 (0%)
e. White	12 (92%)

Demographic Criteria	n asked (n/14)
f. More than one race	0 (0%)
IX. Geographical Location of Residence	7(50%)
a. United States of America (USA)	5(71%)*
b. United Kingdom (UK)	1(14%)*
c. Australia (AU)	1(14%)*
d. Canada (CA)	1 (14%)*

Results expressed as n (%) or mean \pm SD. Unless indicated, percentages are expressed as n/13 times 100, as one participant did not provide demographic data.

* Percentages are expressed as n/7 times 100, as only seven participants provided this data. Table reproduced from [9,15,54,55] with authors' permissions.

Abbreviations: AU, Australia; **BED**, binge eating disorder; **CEDRD**, Registered Dietician Certified in Eating Disorders; **CIES**, Certified Intuitive Eating Specialist; **CIH**, complementary and integrative health; **CA**, Canada; **ED**, eating disorder; **FACNP**, Fellow of the American College of Neuropsychopharmacology; **FAED**, Fellow of the Academy of Eating Disorders; **LD**, Licensed Dietician; **MBChB**, Bachelor of Medicine Chirurgical Doctor/Bachelor of Surgery; **MD**, Medical doctor; **MPH**, Masters in Public Health; **PhD**, Doctor of Philosophy; **RD**, Registered Dietician; **ScD**, Doctor of Science; **UK**, United Kingdom; **USA**, United States of America; **BED**, binge eating disorder;

Table 4.

Themes 1 – 2: Expert Familiarity and Opinions on CIH Use in BED

Theme/Subtheme/Foci/Sub-Foci	n asked (n/14)
Theme 1: Expert Familiarity with CIH use in the context of BED	14 (100%)
I. Expert Familiarity and Opinions on CIH Use in BED	14 (100%)
a. Reported familiarity	9 (64%)
b. Reported not being familiar but then did express some level of familiarity	5 (36%)
c. Reported and expressed no familiarity	0 (0%)
Theme 2: Expert Opinion on CIH Intervention Use (Broadly) in BED Treatment	9 (64%)
II. Expert Opinion on CIH Interventions Use (Broadly) in BED Treatment	9 (64%)
a. Expressed positive/supportive views on CIH use for BED when referencing CIH use broadly	9 (64%)
(vs specific to a singular/specific CIH modality/intervention)	
b. Expressed mixed views on CIH use	5 (36%)
Additional Participant Statements Related to Theme 2, “Expert Opinions on CIH Use in BED”	
<p><i>“The consumer trend of probiotics and prebiotics and supplementation is so enormous and it’s fascinating and ridiculous... When you look at the economic data on probiotics and prebiotics, it’s stunning, I mean, it’s just stunning, the consumer uptake. I think it speaks to how much consumers want to feel better, and they want to do whatever they can to feel better.” [P60, contd. below]</i></p> <p><i>“And so yeah, our people with eating disorders are coming in in droves [saying] like, ‘here’s my 17 supplements, and here’s my three for this, and my five this and oh my gosh, I have so much gas, and then they unload their five different, you know, probiotic supplements, [and it’s] like, ‘no wonder you have so much gas, your gut microbiome is freaking out in there! So, let’s ratchet back some of those and maybe we’ll see if that won’t help. Maybe it’s not your food or not eating [that’s causing your gas], it’s, you know, [all of these supplements]” [P60, contd. below]</i></p> <p><i>“...Like any science, it’s early uptake in the popular press that [translates to] early [patient-uptake in] mental health [interventions] ... sort of ... like psychiatric metabolomics ... there was a paper that came out a couple of years ago now called ‘melancholic microbes,’ ... and it got huge press everywhere, because it was so cool showing this direct connection between your gut health and your mood, which is probably – I think, just personally – probably true, like, I buy it; I’m a believer. And then it got blown into this big popular press thing and then 80 million probiotic companies came on the market and are selling everything, so we’re not quite there yet [in regard to empirical use of pre/probiotics in the context of mental health interventions]. I’m sure there’s some connection. I don’t think we know what it is quite yet. And because our gut microbiome changes when we eat different things and it changes day to day, and it changes based on where we are geographically it’s going to change. So, it’s not like ‘I got this supplement and I’m always going to be happy,’ but that’s the consumer message, right? Like ‘if you eat enough yogurt and you eat enough kimchi and you have enough kombucha, life will be great.’ Yeah, you’ll probably be very gassy if you do.” (P60)</i></p> <p><i>“...one of the things that we know about binge eating disorder specifically is that there’s a really high placebo effect. So, for many individuals it’s not so much the actual treatment that is helping them; it’s being engaged in some kind of intervention, right? So, I think I’m just really open to whatever the science is going to point us towards” (P75)</i></p> <p><i>“My knowledge [of CIH interventions] is slim to none. Period. ...my reading is that folks with binge eating disorder are helped by a whole bunch of different interventions, a whole range, so I wouldn’t be surprised at all – I would expect – that complementary and other methods would be of use, at least to some folks. [but] ... we need controlled trials.” (P46)</i></p>	

Results expressed as n (%). Percentages: n/14 times 100.

Abbreviations: BED, binge eating disorder; CIH, complementary and integrative health; P, participant number (e.g., P60, participant #60).

Table 5.

Theme 3: Specific CIH Interventions Identified in the Context of BED (93%)

Theme/Subtheme/Foci/Sub-Foci	n asked (n/14)
Theme 3, Subtheme 1: Specific CIH Interventions Spontaneously Identified	13 (93%)
I. CIH Interventions Spontaneously Identified by Experts	13 (93%) [*]
a. Mindfulness	10 (71%)
b. Yoga	9 (64%)
c. Supplements/Vitamins/Probiotics/Herbs	8 (57%)
i. Supplements	6 (43%)
ii. Probiotics	3 (21%)
iii. Vitamins	2 (14%)
iv. Herbs	1 (7%)
d. Acupuncture	6 (43%)
e. Meditation	5 (36%)
f. Massage	3 (21%)
g. Mind-Body Interventions	2 (14%)
h. Traditional Chinese Medicine (TCM)	2 (14%)
i – q. The following CIH interventions were spontaneously identified by one expert each: aromatherapy; art therapy; breathwork; bright light therapy; dance therapy; essential oils; pet therapy; prayer, and Thai Chi/Qi Gong	1 (7%) each
Theme 3, Subtheme 2: Analyses of Specific CIH Interventions Spontaneously Identified in the Context of Adult BED are addressed in Supplementary Material S1 and Table S1.	

Results expressed as n (%). Percentages: n/14 times 100.

* Indicates that 13/14 experts spontaneously identified one or more of the CIH interventions identified in subtheme i.2 (a – q) as being used in the context of binge eating disorder.

Abbreviations: **BED**, binge eating disorder; **CIH**, complementary and integrative health; **TCM**, Traditional Chinese Medicine.

Table 6.

Theme 4: Therapeutic Benefits Associated with CIH Use in the Context of BED (93%)

Theme/Subtheme/Foci/Sub-Foci	n asked (n/14)
Theme 4, Subtheme 1: Benefits Associated with CIH Broadly in the Context BED *	5 (36%)
I. Theme 4, Subtheme 1: Functions identified for CIH use broadly in the context of BED *	5 (36%)
a. Helping patients tolerate the hardships of treatment	3 (21%)
b. Helping with mood and/or anxiety regulation/tolerance	2 (14%)
c. "Healing from the inside out"	2 (14%)
d. Probe research	2 (14%)
e – g. Functions identified by one participant each: bridging the current gap in treatment success rates, "treating the person as a whole," and providing space separate or away from treatment	1 (7%) each
Theme 4, Subtheme 2: Benefits Associated with Specific CIH Interventions in BED Treatment	10 (71%)
I. Theme 4, Subtheme 2, Foci i: Regulating/Managing Anxiety/Stress/Emotion/Mood	7 (50%)
a. Functions Associated with Specific CIH Interventions in the Context of BED	
i. Anxiety Reduction	4 (29%)
ii. Mood Management	4 (29%)
iii. Stress Management	3 (21%)
iv. Emotion Awareness & Regulation	2 (14%)
b. Most endorsed interventions in this category	
i. Acupuncture	3 (21%)
ii. Yoga	3 (21%)
iii. Massage	2 (14%)
iv. Meditation	2 (14%)
II. Theme 4, Subtheme 2, Foci ii: Benefits Relationship with the Body and Movement	4 (29%)
a. Functions Associated with Specific CIH Interventions in the Context of BED	
i. Relationship with the Body	3 (21%)
ii. Addressing Body Image	2 (14%)
iii. Healing Trauma Related to Exercise/Movement	2 (14%)
b. Most endorsed interventions in this category	
i. Yoga	4 (29%)
III. Theme 4, Subtheme 2, Foci iii: Biological/Physiological Benefits	4 (29%)
Most Commonly Described Interventions in this Category	
a. Supplements/Vitamins/Pre/Probiotics/Herbs	5 (36%)
i. Most Commonly Endorsed Subcategories in this Category	
• Supplements	4 (29%)
• Vitamins	2 (14%)
• Functional Food/Nutrition	1 (7%)
• Functional Medicine	1 (7%)
• Herbs	1 (7%)

Theme/Subtheme/Foci/Sub-Foci	n asked (n/14)
• Pre and Probiotics	1 (7%)
ii. Most Commonly Identified Supplements, Vitamins, Pre/Probiotics , & Herbs in this Category	
• Chromium	3 (21%)
• Zinc	2 (14%)
• B Vitamins	1 (7%)
• Estrogen/Estrogen-Promoting	1 (7%)
• Inositol	1 (7%)
• Liver-Promoting	1 (7%)
• Magnesium	1 (7%)
• Probiotics	1 (7%)
• St. John’s Wort	1 (7%)
• Tyrosine	1 (7%)
• Vitamin D	1 (7%)
b. Acupuncture	1 (7%)
c. Gastrointestinal Mapping	1 (7%)
d. Hormone Testing/DUTCH Hormone Test	1 (7%)
e. Micronutrient Testing	1 (7%)
IV. Theme 4, Subtheme 2, Foci iv: Benefits that Directly Support Recovery	4 (29%)
a. Functions Associated with Specific CIH Interventions in the Context of BED in this Category	
i. Tolerating distress associated with treatment	4 (29%)
ii. Coping with symptoms associated with the disorder	3 (21%)
iii. Supporting/promoting behavior change	3 (21%)
iv. Providing space “off the ward”	1 (7%)
b. Most endorsed interventions in this category	
i. Yoga	2 (14%)
V. Theme 4, Subtheme 2, Foci v: Food/Eating Regulation	3 (21%)
VI. Theme 4, Subtheme 2, Foci vi: Self-Care	3 (21%)
VII. Theme 4, Subtheme 2, Foci vii: Negative Outcomes that Bypass, Undermine, Impede, or Worsen the Treatment Process	2 (14%)
VIII. Additional benefits and associated interventions are described in Supplementary Material S1 and Table S1.	
Additional Participant Statements Related to Theme 4, Subtheme 2, “ Benefits Associated with Specific CIH Interventions in the Context of BED”	
<p><i>“The main areas of complementary medicine [that] I think about [and use with my patients are] anything related to meditation [and] anything related to acupuncture.” (P72)</i></p> <p><i>“I started doing [intracellular] micronutrient testing ...because I will see deficiencies big time, it can be inositol, chromium” It would be like, first [patients would report] elevated cholesterol, which people will say we need to [put them] on a low-fat diet [for], [but] the reality is that there is actually a deficiency in something. So, I think it’s really important to look at that aspect. ... We, as dietitians, have to remember that although we provide nutrition counseling, ... there’s also a huge medical component to what we’re doing. We need to get bloodwork; we need to look at that. But we need to take it even further. I also do [gastrointestinal] testing, so I’ll do [gastrointestinal] map testing, because we see a lot of issues with the intestinal tract [where the] gut microbiome is impacted, [which then impacts] cognitive function, but ... can [also] increase cravings for carbohydrates. [There is also a specific gut bacteria associated with higher calorie absorption]. [P37, Contd. below]</i></p> <p><i>“...I [also] think that hormones are not looked at enough ... for women and men... Because [maybe a patient’s doctors say] ‘everything’s normal’ [but then I question] ‘what’s normal? Are they testing everything? And you still don’t feel good? So maybe [everything’s] not optimal?’ [So, hormones are] a big thing that I try to really focus on. I’m not saying that [most patients] need medication for [hormones] but even just different nutritional [approaches][can be beneficial]. ...but that’s tricky, right? How do we add in broccoli sprouts that are great for</i></p>	

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Theme/Subtheme/Foci/Sub-Foci	n asked (n/14)
<p><i>supporting women’s estrogen, but we don’t want them to feel like they need to ... eat them every day, so it’s really a very delicate balance of adding in this functional aspect, either through supplements or through foods. I’ll give [my clients] both options. ...I’ll say, here [are] some really great liver-supporting foods and then here [are some liver-supporting supplements].” [P37, Contd. below]</i></p> <p><i>“So ... I’ve started doing a lot of [biological testing] in my practice and I think it’s helpful because it also is something concrete so again, we’re not just focusing on the food, we’re looking at nutrition from a perspective of something that’s not to do with their weight and that’s soimportant, that we’re saying like, ‘I want you to feel better.’ That’s an important aspect.” (P37)</i></p> <p><i>“There’s also the mind-body work. ... I mean ...[Eye Movement Desensitization and Reprocessing (EMDR)] ...is really not considered complementary, but for trauma, that’s big. A lot of people with binge eating disorder have been really traumatized, interpersonally, bullied and that sort of thing. So, they have a lot of underlying trauma.” (P7)</i></p>	

Results expressed as n (%). Percentages: n/14 times 100.

* Indicates the function was not related to any singular CIH intervention.

Abbreviations: **BED**, binge eating disorder; **CIH**, complementary and integrative health; **DUTCH**, Dried Urine Test for Comprehensive Hormones (dutchtest.com); **EMDR**, Eye Movement Desensitization and Reprocessing; **TCM**, Traditional Chinese Medicine.

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Table 7.

Theme 5: Empirical Support for CIH Use in BED (71%)

Theme//Subtheme//Foci//Sub-Foci	n asked (n/14)
Theme 5, Subtheme 1: Familiarity with Existing CIH Literature	8 (57%)
I. Theme 5, Subtheme 1, Foci i: Interventions identified as having a literature base	8 (57%)
a. Mindfulness	4 (29%)
b. Acupuncture	4 (29%)
c. Yoga	3 (21%)
d. Massage	2 (14%)
e. Mindfulness-based interventions (MBIs)	1 (7%)
f. Mindful Eating	1 (7%)
g. Self-compassion	1 (7%)
Theme 5, Subtheme 2: Lacking A Literature Base/Empirical Support	5 (36%)
I. Theme 5, Subtheme 2, Foci i: Interventions identified as lacking empirical support	5 (36%)
a. Supplements and herbs	3 (21%)
b. Acupuncture	1 (7%)
c. Traditional Chinese Medicine (TCM)	1 (7%)
II. Theme 5, Subtheme 2, Foci ii: Denied any studies testing CIH interventions in the context of BED	1 (7%)
III. Theme 5, Subtheme 2, Foci iii: Denied familiarity with the literature base **	2 (14%)
Theme 5, Subtheme 3: Need for Empirical Testing and Support	7 (50%)
I. Theme 5, Subtheme 3, Foci i: Described a need for high-quality empirical support and testing	7 (50%)
Additional participant statements related to Theme 5, “Empirical Support”	
<i>Subtheme 2: Lacking a Literature Base/Empirical Support</i>	
<i>“... I don’t know if I’ve even seen any [literature] about acupuncture [in the context of eating disorders] to be honest ...it’s just an area of literature that I’m not as familiar with.” (P75)</i>	
<i>“I would say, for kind of a variety of reasons, there might be enough generic, nonspecific, but beneficial effects associated with yoga, meditation, and mindfulness at least [for them to warrant research on their effectiveness in the context of BED].” (P33)</i>	
<i>“There’s really not much of any [peer-reviewed literature] around acupuncture [in the context of BED] but I am a huge fan of it. I think there’s a lot of data on acupuncture [in the context of] hormones, headaches, pain, anything related to infertility...” (P72)</i>	
<i>Subtheme 3: Need for Empirical Support (and Challenge of Empirical Testing for Individually-Tailored Interventions)</i>	
<i>“Different people have different stress responses [and different stressors] ...and...have to figure out what’s right for them, ... that goes back to the mindfulness aspect, you have to figure out what is good for you and how can you design your life in a way that can be healthy and happy as much as one can be.” (P53)</i>	

Results expressed as n (%). Percentages: n/14 times 100.

* Indicates the function was not related to any singular CIH intervention.

** Denied any familiarity with the literature base and/or declined to comment.

Abbreviations: **BED**, binge eating disorder; **CIH**, complementary and integrative health; **MBI**, mindfulness-based intervention; **P**, participant (e.g., “P75” connotes participant number 75; numbers were assigned to the 14 participants at random); **TCM**, Traditional Chinese Medicine.

Table 8.

Themes 6 and 8: Correct Implementation & CIH Recognition in Conventional Treatment

Theme//Subtheme//Foci//Sub-Foci	n asked (n/14)
Theme 6: Importance for Correct Implementation	8 (57%)
I. Theme 6, Subtheme 1: Importance of Using CIH Interventions Accurately and Appropriately	8 (57%)
II. Theme 6, Subtheme 2: CIH Interventions Described as Needing Accurate and Appropriate Implementation	8 (57%)
a. Supplements/Vitamins/Pre/Probiotics/Herbs	4 (29%)
b. Yoga	3 (21%)
c. Meditation	2 (14%)
Theme 8: Recognition of CIH Use in Current Conventional Treatments	6 (43%)
I. Theme 8, Subtheme 2: Spontaneously Described Use of at least one CIH Intervention in Current Clinical/Conventional Practice (not necessarily their own practice)	6 (43%)
II. Theme 8, Subtheme 2: CIH Interventions Spontaneously Described as being Used in Conventional BED Treatments	6 (43%)
a. Meditation	5 (36%)
b. Mindfulness	5 (36%)
c. Described by one participant each: self-compassion, supplements, yoga	1 (7%) each

Results expressed as n (%). Percentages: n/14 times 100.

Abbreviations: **BED**, binge eating disorder; **CIH**, complementary and integrative health.

Table 9.

Theme 7: Participant Use of CIH Interventions in the Context of BED (71%).

Theme//Subtheme//Foci//Sub-Foci	n asked (n/14)
Theme 7, Subtheme 1: CIH Interventions Participants Describe Using	10 (71%)
I. Participant Use of CIH Interventions in BED Treatment	7 (50%)
II. Interventions Participants Identified as Using in their Clinical Practice or Center	
a. Yoga	5–6 (36–43%)*
b. Meditation	4 (29%)
c. Mindfulness	4 (29%)
d. Acupuncture	2–3 (14–21%)*
e. Supplements, Vitamins, Probiotics, Herbs	2 (14%)
i. Most Commonly Endorsed Subcategories in this Category	
• Supplements	2 (14%)
• Vitamins	2 (14%)
ii. Specific Supplements, Vitamins, Pre/Probiotics , & Herbs Identified in this Category	
• B Vitamins	1 (7%)
• Chromium	1 (7%)
• Zinc	1 (7%)
• Estrogen/Estrogen-Promoting	1 (7%)
• Inositol	1 (7%)
• Liver-Promoting	1 (7%)
• Magnesium	1 (7%)
• Tyrosine	1 (7%)
• Vitamin D	1 (7%)
iii. Supplements	2 (14%)
iv. Vitamins	2 (14%)
f – I. Interventions used by one participant each: break room, EMDR, essential oils, functional food, functional medicine, functional nutrition, intuitive eating, massage, Tai Chi/Qi Gong, and TCM.	
III. Tools one participant (7%) described using in clinical practice for BED	
a. Gastrointestinal Mapping	1 (7%)
b. Hormone Testing/DUTCH Hormone Test	1 (7%)
c. Micronutrient Testing	1 (7%)
Theme 7, Subtheme 2: Clinical Utility Associated with Current Participant CIH Use	7 (50%)
I. Clinical Uses Participants Associate with their CIH Use in the context of Eating Disorders and BED	7 (50%)
a. Coping with Symptoms of the Disorder	6 (43%)
b. Managing Stress, Anxiety, or Mood Disorders	5 (36%)
c. Addressing Biological Issues (e.g., Inflammation, GI Symptoms)	4 (29%)
d. Healing Trauma	4 (29%)
e. Connecting with the Body	3 (21%)

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Theme//Subtheme//Foci//Sub-Foci	n asked (n/14)
f. Coping with Change	2 (14%)
g. Food Control	2 (14%)
Additional participant statements related to Theme 5, Subtheme 2: “Clinical Uses Participants Associate with their CIH Use in the Context of BED”	
<p>“...I very, very, very strongly believe that it’s important that we heal the relationship with movement for people with BED. Because a lot of times, the demand to move has been ... an oppressive demand upon the body and the psyche that is founded in shaming the person and ... anytime you’re given the message overt or covert, that something is ... wrong with you, like, ‘you’re bad, you’re too much, you’re big, you’re repulsive, you’re gluttonous...’ – and you know, that’s really the message that people internalize through a lot of experiences with healthcare practice, practitioners, families, schools, etc. – [there is going to be trauma involved]. [P7, Contd. below]</p> <p>“...So [we try to find] ways that we begin to move the body that come from the authentic essence of the self of the person. Sometimes you have to back away, back [way] off of somebody, and allow them to generate within themselves their innate desire to move in whatever way makes sense to them. I’m very particular about that because individuals with BED have the experience of their psyche being intruded on by people who don’t [really] know what they’re doing ... [and] it’s damaging to their psyche. [P7, contd. below]</p> <p>“So people have to be able to move in a way that’s not compensatory, that’s not like, ‘I need to move because I need to do 15 minutes of aerobics for five times a week because the Surgeon General said, so, you know, I need to go move, I need to start a gym membership and I need to go into the gym and I need to get on the Stairmaster for 30 minutes and it needs to be at level this and I need to care about how many calories I’ve burned. You know, I need to count how many steps I’ve walked.’ All that ... just messes people up. So [movement] has to be generated from within. There’s a type of movement [I like to use for that], which is called Qi Gong ... [it’s] a form of Tai Chi. [P7, Contd. below]</p> <p>“But ...healing the body from the inside out, whatever that may be. ...healing from the inside out is really important. Moving the body from a place of love and acceptance, not ... from the place of aggression [or] from a mindset of, ‘there’s something wrong about me that I need to fix,’ but [from a mindset of] ‘there’s something beautiful about me that I need to love.’” (P7)</p> <p>“The main areas of complementary medicine [that] I think about [and use with my patients are] anything related to meditation [and] anything related to acupuncture.” (P72)</p> <p>“There’s also the mind-body work, you know, there’s, I mean ...[Eye Movement Desensitization and Reprocessing (EMDR)] ...is really not considered complementary, but for trauma, that’s big. A lot of people with binge eating disorder have been really traumatized, interpersonally, bullied and that sort of thing. So, they have a lot of underlying trauma.” (P7)</p>	

Results expressed as n (%). Percentages: n/14 times 100.

* Lower value represents spontaneous identification in the context of BED; higher value represents endorsement in the context of eating disorders broadly.

Abbreviations: **BED**, binge eating disorder; **CIH**, complementary and integrative health; **DUTCH**, dried urine test for comprehensive hormones (dutchtest.com); **EMDR**, Eye Movement Desensitization and Reprocessing; **GI**, gastrointestinal; **P**, participant (e.g., “P7” refers to participant number 7; the 14 participants were assigned identification numbers at random); **TCM**, Traditional Chinese Medicine.

Table 10.

CIH Interventions Associated with Different Utilities or Factors Relevant to BED

Intervention Utility (in BED)	Intervention BED Experts Associate with BED Utility (%)*	Interventions Empirically Associated with BED Factor/Outcome/Utility
Regulating/Managing Anxiety/Stress/Mood/Emotions		
Reducing Anxiety	Acupuncture (14%), Massage (14%), Yoga (7%), Nature Therapy (7%), Meditation/Mindfulness (7%).	Acupuncture [25,110]**, Yoga [111]**
Managing Stress	Acupuncture (14%), Massage (14%), Yoga for sleep regulation (7%).	Acupuncture (Reduction in Stress Responses) [110]**, Yoga (reductions in cortisol reactivity to stress)[112]**, Supplements (R. rosea, Salidroside, reduce stress-induced cortisol increases and stress-induced binge eating) [78,113].***
Managing Mood	Supplements (e.g., St. John's Wort, Vitamin D: 14% [§]), Bright Light Therapy (7%), Nature therapy (7%).	Yoga (Negative Affect, Alexithymia)** [49,114,111]; ** Acupuncture (Depression) [25, 110]; ** Mindfulness/MBIs (Depression)[115].
Emotion Regulation	Break rooms (7%, for anger), Meditation (7%), Yoga (7%).	Mindfulness/MBIs [115].
Healing & Strengthening Positive Relationships with the Body & Movement		
Relationship with the Body	Yoga (14%), Mindfulness (7%), Self-compassion (7%), Tai Chi/Qi Gong (7%).	Yoga [45,49,50,114].
Relationship with Body Image	Yoga (7%), Mindfulness (7%), Self-care (7%), Self-compassion (7%), Tai Chi/Qi Gong (7%).	Yoga [45,49,50,114].
Relationship w Physical Activity	Mindfulness (e.g., mindful movement and MBIs)(14%), yoga (14%).	Yoga [49].
Healing Exercise Trauma	Yoga (14%).	Yoga [49].
Biological/Physiological Benefits		
Specific Supplements	Chromium (21%); Zinc (14%); B Vitamins, Estrogen-Promoting, Inositol, Liver-Promoting, Magnesium, Probiotics, St. John's Wort, Tyrosine, Vitamin D (7% each).	Rhodiola rosea, Salidroside (abolishing stress- induced cortisol increases and stress-induced binge eating) [78,113].***
Diagnostic Tests/Tools	Gastrointestinal Mapping, Hormone // DUTCH Hormone Testing, Micronutrient Testing (7% each).	No studies exist supporting the use of these diagnostic tools in the context of BED.
Improvements in BMI, Hip, and Waist Measures	None reported by interviewed experts (0%).	Acupuncture [116]**, Yoga [50].
Other Bio-physiological Issues	Acupuncture (Inflammation, Hormone Regulation, Trauma; 7%).	Acupuncture (Inflammation, [Para]Sympathetic Tone, Hormone Secretion Regulation)[110].***
Directly Supporting Recovery		
ED Psychopathology [‡]	None reported by interviewed experts (0%).	Mindfulness [24], Yoga [50].

Intervention Utility (in BED)	Intervention BED Experts Associate with BED Utility (%) [*]	Interventions Empirically Associated with BED Factor/Outcome/Utility
Reducing Binge Eating, OE, & Loss of Control Eating	Mindfulness (14%), Acupuncture (7%), Deep Breathing (7%).	Mindfulness/MBIs [24,115], Yoga [49,114], Acupuncture [17,25,64,110,116-134], ^{***} Supplements (R. rosea, Salidroside) [78,113]. ^{***}
Tolerating Treatment and Coping with Symptoms	Yoga (14%), Acupuncture (7%), Deep breathing (7%), Massage (7%), Mindfulness (7%).	Acupuncture – General Use [25] ^{**} Acupuncture – NADA Protocol [132,133,135-149]. ^{**}
Behavior Change	Yoga (14%), Mindfulness (7%).	Mindfulness (24, 49), Yoga (49, 114), Acupuncture [17,25,64,110,116-134]. ^{**}
General Healing		
Healing/Addressing Trauma	Yoga (14%), [‡] Acupuncture (7%), EMDR (7%), Guided Meditation/Mindfulness (7%).	Yoga (49, 150) [‡] , EMDR [151].
Patient-Driven Intrinsic Healing	Acupuncture (7%), Yoga (7%). [‡]	Acupuncture [25]. ^{**}

Complementary and Integrative Health Interventions Associated with Different Utilities or Factors Relevant to Binge Eating Disorder Management and Care.The left-hand column outlines different utilities for CIH intervention use in the context of BED that BED experts identified in this study. The second/central column lists each CIH intervention that a BED expert in this study associated with the specific utility or BED factor/outcome outlined in column 1. The far right-hand column identifies CIH interventions that are associated with the specific BED factor/outcome/intervention utility in the literature, with the specific literature cited in brackets. **Symbols:**

* Percentages indicate the percentage of participants that associated the particular CIH intervention with the particular utility/benefit. Expressed as n/14 times 100.

** Findings observed in an overweight or eating disorder population not specific to BED (e.g., anorexia nervosa, overweight and obesity).

*** Some findings observed in preclinical (rodent) models.

[‡] Specifically, in the context of shame/stigma-based trauma related to the body and exercise/movement.

[‡] Findings in the context of individuals with PTSD, not BED or an ED.

[‡] Improving global eating disorder psychopathology (e.g., binge eating scale (BES) scores).

Abbreviations: **BE**, binge eating; **BED**, binge eating disorder; **BES**, Binge Eating Scale; **CIH**, complementary and integrative health; **DUTCH**, dried urine test for comprehensive hormones (dutchtest.com); **ED**, eating disorder; **EMDR**, Eye Movement Desensitization and Reprocessing; **GI**, gastrointestinal; **LOC**, loss of control; **MBI**, mindfulness based intervention; **OE**, overeating.

Table 11. CIH Interventions and Their Associated Uses, Strengths, Limitations, and Caveats

Intervention	Uses	Strengths, Limitations, & Caveats
<p>Mindfulness</p> <p>Uses:</p> <ul style="list-style-type: none"> - Included in Conventional Treatments [35,41,112] - Managing Mood/Depression [115] - Reducing Anxiety (7%) - Emotion Regulation [115] - Healing the Relationship with the Body (7%) - Healing the Relationship with Body Image (7%) - Healing Relationship with Movement and Exercise (14%) - Improving Global ED Psychopathology[§] [24] - Reducing BE, OE, and LOC Eating (14%)[24,115] - Tolerating Treatment and Coping with Symptoms (7%) - Behavior Change (7%)[24,49] - Healing/Addressing Trauma (7%) 	<p>Strengths:</p> <ul style="list-style-type: none"> - Potential barrier in client uptake [152].1 - Lack of public education/awareness about mindfulness, esp. in the context of BED. (e.g., what it is, how to access resources, how it relates to BED). - Many mindfulness resources exist that lack empirical support. <p>Strengths:</p> <ul style="list-style-type: none"> - Empirically supported in the context of BED [24,49,115]. - Free and low-cost options [83,153,154]. - Remote/virtual delivery [33,37]. - Overcomes access barriers (cost, insurance coverage, provider scarcity, geographic proximity: [33]). - Effectiveness not dependent on one’s feelings about use. 	<p>Limitations:</p> <ul style="list-style-type: none"> - More intensive styles of yoga can be “not therapeutic;” some can endorse ED symptoms. - Many yoga classes, resources, & forms lack empirical support in the context of BED. - Some yoga classes, resources, & forms pose risk for potential harm in the context of BED. <p>Strengths:</p> <ul style="list-style-type: none"> - Costs, location, and provider stigmatization may exist in some yoga studios/classes. - Empirically supported in the context of BED [45,49,50,111,112,114,150].* - Virtual/remote delivery options available [155–166]. - Free/low-cost tutorials (e.g., https://yoga.dasa.ncsu.edu). - Options to overcome treatment costs, insurance coverage, provider scarcity, geographic proximity. - The variety that exists in the field can provide “something for everyone.” <p>Caveats/Notes:</p> <ul style="list-style-type: none"> - More intensive styles of yoga can be “not therapeutic;” some can endorse ED symptoms.
<p>Yoga</p> <p>Uses:</p> <ul style="list-style-type: none"> - Healing Relationship with the Body (14%) [45,49,50,114] - Healing & Strengthening Body Image (7%) [45,49,50,114] - Healing Relationship with Physical Activity(14%) [49] - Healing Trauma Related to Physical Activity (14%) [49] - Reducing Anxiety (7%) [111] - Reducing Stress [112]^{†*} - Sleep Regulation (7%) - Managing Mood^{††*} [49-114-111] - Emotion Regulation (7%) - Improvements in BMI, Hip, and Waist Measurements [50] - Improving Global ED Psychopathology[§] [50] - Reducing Binge Eating, Overeating, and LOC Eating [49-114] - Tolerating Treatment and Coping with Symptoms (14%) - Behavior Change (14%) [49-114] - Healing/Addressing Trauma (14%)[‡] [49-150] - Patient-Driven, Bottom-Up, Intrinsic Self-Healing (7%)[‡] 	<p>Limitations:</p> <ul style="list-style-type: none"> - Lacks empirical testing in the context of BED. - Treatment costs (\$60–\$250/session)[167,168]. - Limited insurance coverage [169–172]. - Time burden (2–5 times/wk. x 6–8 wks. [62,173–175]. - Provider scarcity (in some regions). - Weight loss protocols can endorse ED symptoms. <p>Strengths:</p> <ul style="list-style-type: none"> - Empirically supported in the context of weight and EDs [17,25,64,110,116–149].* - Community acupuncture & NADA protocols are free/low-cost (\$0–\$50/session)[176]. - Ear seeds can be made or purchased online (\$0–50), easily self-administered & stimulated [177,178]. - Options to overcome treatment costs, insurance coverage, provider scarcity, geographic proximity. - NADA protocol offers real-time alternative to binge eating. 	<p>Limitations:</p> <ul style="list-style-type: none"> - Healing Relationship with the Body (14%) [45,49,50,114] - Healing & Strengthening Body Image (7%) [45,49,50,114] - Healing Relationship with Physical Activity(14%) [49] - Healing Trauma Related to Physical Activity (14%) [49] - Reducing Anxiety (7%) [111] - Reducing Stress [112]^{†*} - Sleep Regulation (7%) - Managing Mood^{††*} [49-114-111] - Emotion Regulation (7%) - Improvements in BMI, Hip, and Waist Measurements [50] - Improving Global ED Psychopathology[§] [50] - Reducing Binge Eating, Overeating, and LOC Eating [49-114] - Tolerating Treatment and Coping with Symptoms (14%) - Behavior Change (14%) [49-114] - Healing/Addressing Trauma (14%)[‡] [49-150] - Patient-Driven, Bottom-Up, Intrinsic Self-Healing (7%)[‡]
<p>Acupuncture</p> <p>Uses:</p> <ul style="list-style-type: none"> - Reducing Anxiety (14%) [25,110].* - Managing Stress (14%) [110]^{†*} - Managing Depression [25-110].* - Improvements in BMI, Hip, Waist Measurements [116].* - Managing/Improving Inflammation (7%) [110].^{†*} - Hormone Regulation/Secretions (7%) [110].^{†*} - [Para]Sympathetic Regulation/Tone [110].^{†*} - Healing/Addressing Trauma (7%) - Reducing BE, OE, LOC-E (7%) [17-25-64-110-116-134].* - Tolerating Treatment, Symptom Coping (7%) [25[‡],132-149].^{‡*} 	<p>Limitations:</p> <ul style="list-style-type: none"> - Lacks empirical testing in the context of BED. - Treatment costs (\$60–\$250/session)[167,168]. - Limited insurance coverage [169–172]. - Time burden (2–5 times/wk. x 6–8 wks. [62,173–175]. - Provider scarcity (in some regions). - Weight loss protocols can endorse ED symptoms. <p>Strengths:</p> <ul style="list-style-type: none"> - Empirically supported in the context of weight and EDs [17,25,64,110,116–149].* - Community acupuncture & NADA protocols are free/low-cost (\$0–\$50/session)[176]. - Ear seeds can be made or purchased online (\$0–50), easily self-administered & stimulated [177,178]. - Options to overcome treatment costs, insurance coverage, provider scarcity, geographic proximity. - NADA protocol offers real-time alternative to binge eating. 	<p>Limitations:</p> <ul style="list-style-type: none"> - Healing Relationship with the Body (14%) [45,49,50,114] - Healing & Strengthening Body Image (7%) [45,49,50,114] - Healing Relationship with Physical Activity(14%) [49] - Healing Trauma Related to Physical Activity (14%) [49] - Reducing Anxiety (7%) [111] - Reducing Stress [112]^{†*} - Sleep Regulation (7%) - Managing Mood^{††*} [49-114-111] - Emotion Regulation (7%) - Improvements in BMI, Hip, and Waist Measurements [50] - Improving Global ED Psychopathology[§] [50] - Reducing Binge Eating, Overeating, and LOC Eating [49-114] - Tolerating Treatment and Coping with Symptoms (14%) - Behavior Change (14%) [49-114] - Healing/Addressing Trauma (14%)[‡] [49-150] - Patient-Driven, Bottom-Up, Intrinsic Self-Healing (7%)[‡]

Intervention	Uses	Strengths, Limitations, & Caveats
<p>Supplements, Vitamins, Pre- and Probiotics, Herbs</p>	<p>Uses</p> <ul style="list-style-type: none"> - Behavior Change [17:25-64;110-116-134] * - Patient-Driven Intrinsic Self-Healing (7%) [25] * <p>Uses:</p> <ul style="list-style-type: none"> - Managing Stress: R. rosea, Salidroside [78-113] ** - Managing Mood: St. John's Wort, Vitamin D (14%) § - Improvements in BMI, Hip, Waist Measures [116] ** - Correcting Biological Deficiencies and Imbalances: Chromium (21%) Zinc (14%) B Vitamins Estrogen-Promoting Inositol Liver-Promoting Magnesium Probiotics St. John's Wort Tyrosine Vit D (7% each) - Block stress-induced cortisol/BE; R. rosea, Salidroside [78-113] ** - Tolerating Treatment, Symptom Coping (7%) [25;132-149] ¶¶ - Behavior Change [17:25-64;110-116-134] * - Healing/Addressing Trauma (7%) - Patient-Driven Intrinsic Self-Healing (7%) [25] * 	<p>Limitations:</p> <ul style="list-style-type: none"> - Lack of empirical support. - Risk of unregulated substances in many supplements (e.g., high levels of caffeine/stimulants). - Risk of harmful endorsements of weight loss over addressing underlying ED psychopathology. - Appropriate diagnostic testing has cost and insurance coverage barriers. <p>Strengths:</p> <ul style="list-style-type: none"> - Some experts endorse potential to correct biological and physiological deficiencies that impact BE. <p>Caveats/Notes:</p> <ul style="list-style-type: none"> - Prescriptive use should include diagnostic testing, such as Gastrointestinal (GI) Mapping (7%), Hormone Testing/DUTCH Hormone Test (7%), Micronutrient Testing (7%).

CIH Interventions and their Associated Uses, Strengths, Limitations, & Caveats, as endorsed by BED experts and in the literature. Percentages indicate percent of participants (n/14*100) that associated the intervention with the utility/benefit. **Symbols:**

* Findings observed in an overweight or ED population not specific to BED.

** Some findings observed in preclinical (rodent) models.

§ Percentage and count are for all interventions referenced.

¶ Specifically in the context of shame/stigma-based trauma related to the body and physical activity.

‡ Findings in the context of PTSD, not BED/ED.

§ E.g., BES scores

‡ E.g., cortisol reactivity to stress

‡‡ E.g., negative affect, alexithymia **

¶ General dry needle acupuncture

¶ NADA protocol.

€ E.g., reduction in stress-induced cortisol increases and stress-induced binge eating. Findings also suggest meditation and mindfulness can be effective, regardless of one's feelings towards these practices. Informing clients they don't have to like mindfulness or meditation for the intervention to be effective may improve uptake.

Abbreviations: **BE**, binge eating; **BED**, binge eating disorder; **CIH**, complementary and integrative health; **DUTCH**, dried urine test for comprehensive hormones (dutchtest.com); **ED**, eating disorder; **EMDR**, Eye Movement Desensitization and Reprocessing; **GI**, gastrointestinal; **LOC-E**, loss of control eating; **MBI**, mindfulness-based intervention; **NADA**, National Acupuncture Detoxification Association; **OE**, overeating; **R. rosea**, *Rhodiola rosea*.