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Brief cognitive-behavioral therapy for binge-eating disorder: Clinical effectiveness in a routine clinical setting

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Conflicts of interest

Author GW receives royalties on the treatment manual used in this research. The other authors have no conflict of interest.

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Abstract

Brief cognitive-behavioral therapy (CBT) is effective in working with non-underweight eating disorder patients across transdiagnostic groups. However, it is not clear whether it will be as effective in the treatment of binge-eating disorder, where emotional eating is likely to play a larger role than starvation-driven eating. This case series tested whether brief, 10-session CBT (CBT-T) would be effective, in a case series of 53 patients with binge-eating disorder. Attrition rates were comparable to previous research. Eating attitudes, binge frequency, anxiety and depression were measured. Remission was measured comparing different categorical methods: 'cut off'; Reliable Change Index; and Clinically Significant Change. CBT-T was effective for binge-eating disorder patients, at comparable levels to other non-underweight patients. All measure of pathology were significantly reduced, with large to moderate effect sizes. When categorical changes were used to indicate remission, Reliable Change Index and Clinically Significant Change levels were more appropriate than existing cut-off methods, potentially because of the lower levels of initial restrained eating in this clinical group. CBT-T's effectiveness in transdiagnostic groups is replicated in binge-eating disorder patients, despite their greater level of emotionally-driven eating. The use of more stringent definitions of remission (Clinically Significant Change and Reliable Change Index) should be used more widely, to ensure realistic estimates.

Keywords:

Binge-eating disorder; cognitive-behavioral therapy; intervention; remission

Key learning aims:

- What is necessary for brief CBT to be effective for binge-eating disorder (BED)?
- Is CBT less effective due to the emotion-focused basis for many cases of BED?
- What is the most appropriate way to measure remission in CBT for BED?

Brief cognitive-behavioral therapy for binge-eating disorder:

Clinical effectiveness in a routine clinical setting

Cognitive-behavioral therapy for eating disorders (CBT-ED) is an effective intervention for a range of eating disorders. Randomised control trials and case series have shown that patients make significant improvements with CBT-ED (Byrne, Fursland, Allen & Watson, 2011; Fairburn et al., 2009; Ghaderi, 2006; Knott, Woodward, Hoefkens & Limbert, 2015; Signorini, Sheffield, Rhodes, Fleming & Ward, 2018; Turner, Marshall, Stopa & Waller, 2015; Waller et al., 2014). Consequently, the UK's National Institute for Health and Clinical Excellence (NICE, 2017) has recommended different forms of CBT-ED for a range of eating disorders. When individual CBT-ED is most appropriate, NICE (2017) recommends 16-20 sessions, which is relatively long and expensive compared to CBT for other disorders (e.g., anxiety and depression). Recent research has demonstrated that a 10-session CBT-ED (CBT-T) is effective for non-underweight transdiagnostic eating disorder groups (Pellizzer et al., 2019; Waller et al., 2018), making it viable to offer to people of varying symptoms. However, its specific effectiveness for individual diagnostic groups has not yet been assessed, where the presence and function of symptoms differs. In particular, it remains to be determined whether CBT-T is specifically effective among patients with binge-eating disorder, who are not marked by use of compensatory behaviors and whose bingeing is more likely to be driven by emotional factors than by starvation.

In determining the effectiveness of therapy for eating disorders, it is important to consider the definition used as reductions in core pathology are relatively meaningfulness if the change is small. For example, it is common to use a reduction in key scores to below a cut-off (Kendall et al., 2009). In eating disorders, this has been operationalised as a reduction in Eating Disorders Examination Questionnaire (EDE-Q; Fairburn, 2008) scores to below 2.77 (in the UK), where falling to below that level is commonly used as a cut-off for achieving remission. However, such changes might be very small and still meet that criterion, and binge-eating disorder patients often start with lower EDE-Q scores than other eating disorder groups, due to their lack of strong restrictive patterns. Therefore, it is also important to consider more

meaningful categorical indices of change. To address this issue, Reliable Change Index (RCI) and Clinically Significant Change (CSC) methods can be used (Jacobson & Truax, 1991). These measures of remission have been widely used outside of eating disorder research. The application of more stringent measures of remission ensures that clinicians and researchers can be more certain of the effectiveness of therapies for binge-eating disorder.

Therefore, the aim of this study was to test the effectiveness of brief CBT-ED (CBT-T), specifically for binge-eating disorder treated in a routine clinical setting. Outcomes will include eating pathology, as well as comorbid mood and anxiety. Different indices of remission in such a population will be compared, in order to provide realistic estimates of remission rates.

Method

Ethics

Ethical permission was not sought as the study evaluated existing practice (National Health Service Research Authority, 2011). All patients included in the analysis gave written consent for their outcomes to be used anonymously for review of outcomes.

Design

A case series design was used to evaluate the effectiveness of CBT-T for binge-eating disorder, with no control group. Outcomes were measured at early in treatment (session 4), the end of therapy (session 10), and three-month follow-up. Intention-to-treat analyses were used, with multiple imputations to correct for missing data.

Participants

Sample size analysis indicated that a total of 15 patients were to ensure adequate power to detect small effects on the primary outcome variable (EDE-Q Global score), assuming 95% power at a 5% significance level, given the large effect sizes observed in previous studies (Waller et al., 2018). Fifty-three patients began CBT-T (41 female, 11 male, 1 transgender person), meaning that the study was well-powered.

At assessment, all patients met criteria for a DSM-5 diagnosis (American Psychiatric Association, 2015) of binge-eating disorder (BED). All reported at least one objective binge per week. Exclusion criteria for the purpose of this study included episodes of purging or

laxative use (during therapy or over the month preceding therapy), low weight (BMI < 17.5), active suicidality, or self-harm. The group's characteristics at the beginning of therapy are provided in Table 1.

Insert Table 1 about here

Measures and Procedure

The following measures were used to assess eating pathology and associated mood states. All of the measures are well-validated and are widely used to assess progress in eating disorders. Patients completed all measures at sessions 1, 4, 10 (end of treatment) and at the three-month follow-up:

- eating attitudes (EDE-Q version 6; Fairburn, 2008)
- depression (Personal Health Questionnaire-9 [PHQ9]; Kroenke, Spitzer & Williams, 2001)
- anxiety (Generalized Anxiety Disorder-7 [GAD7]; Spitzer, Kroenke, Williams & Lowe, 2006).

Diary records were used to measure weekly frequency of objective binge eating. Body Mass Index (BMI) was calculated from weight and height measured objectively during therapy sessions.

Intervention

CBT-T is a brief cognitive behavioral therapy designed for non-underweight eating disorder patients (Waller, Turner, Tatham, Mountford & Wade, 2019). The therapy focuses on restoring nutrition, exposure therapy, behavioral experiments, work on emotional triggers, and body image work. It has shown to be effective in transdiagnostic eating disorder groups (Pellizzer at al., 2019; Waller et al., 2018). However, the effectiveness of CBT-T in a binge-eating disorder group has not previously been tested. The therapy was delivered individually by the lead author, supervised by the other authors.

A proportion of the data were collected during the COVID-19 pandemic. A total of nine

patients (17%) were transferred to video calling platforms and self-weighing at home during therapy, and a further 11 patients (20.8%) had their follow-ups moved to online meetings during this time. The therapy was adapted to make it effective when delivered remotely (Waller et al., 2020).

Data analysis

Data analysis took place using SPSS (v.24). Intention-to-treat analyses were used, with multiple imputations (five iterations) to replace missing data. For dimensional changes, paired *t*-tests were used to evaluate change over the course of therapy in eating attitudes (EDE-Q), binge frequency, depression (PHQ9), anxiety (GAD7), and BMI. Effect sizes (Cohen's *d*) were calculated for paired *t*-tests.

For categorical remission, the percentage of patients achieving meaningful change in EDE-Q Global scores was calculated based on the number of patients who met each of the following indices of meaningful change: 'cut off' on EDE-Q Global score (dropping to below 2.77); Reliable Change Index (RCI; Jacobson and Truax, 1991); and Clinically Significant Change (CSC; Jacobson and Truax, 1991). Achievement of RCI indicates change is not due to measurement error. Achievement of CSC indicates change is substantial, relative to the clinical and non-clinical ranges of EDE-Q scores. The criteria for RCI was a reduction in EDE-Q Global score of $\geq$1.38, while the criterion for CSC was an EDE-Q reduction of $\geq$1.70 (both calculated using Evans' [1998] online calculator).

Results

Attrition

A total of 41 patients completed the 10 sessions of CBT-T (or agreed an earlier finish as therapy had met its targets). Thus, the attrition rate was 22.6%, which is at the lower end of the range found in previous CBT-ED effectiveness studies (Byrne et al., 2011; Dalle Grave et al., 2015; Knott et al., 2015; Raykos et al., 2013; Rose & Waller, 2017; Signorini et al., 2018; Turner, Bryant-Waugh at al., 2015; Turner, Marshall et al., 2015).

Symptom reduction across therapy

Eating attitudes, binge frequency, depression, anxiety and BMI were assessed at

sessions 1, 4, 10 and three-month follow-up. Table 2 shows the means and standard deviations for eating attitudes (EDE-Q), binge frequency per week, depression (PHQ9), anxiety (GAD7) and BMI over the course of therapy. Outcomes are tested (intention-to-treat) using paired *t*-tests (*N* = 53) and effect sizes (Cohen's *d)*.

Insert Table 2 about here

There were significant reductions in eating attitudes, binge frequency, depression and anxiety from sessions 1 to 10, with significant reductions made in the first four weeks. All the effect sizes from by the end of therapy were large, apart from a medium effect for anxiety. Very large effect sizes were observed between sessions 1 and 10, with a substantial amount of that change achieved by session 4. All changes were maintained at follow-up.

Categorical measures of remission

Three categorical measures of remission were used: 'cut off' (an EDE-Q score below 2.77 at session 10); Reliable Change Index (EDE-Q Global reduction ≥ 1.38); and Clinically Significant Change (EDE-Q Global reduction ≥ 1.70). Multiple imputations for missing data and intention-to-treat analyses were used.

Considering the 'cut-off' method, 46 patients (87.2%) were below the 2.77 score at the end of therapy, and 50 patients (94.3%) met this criterion at follow-up. However, these findings have to be tempered by the fact that 37.6% started therapy at EDE-Q < 2.77 (as binge-eating disorder patients often have very low EDE-Q Restraint scores at the start of therapy). Therefore, those rates reflect a c.50% shift to below the cut-off. The Reliable Change Index (RCI) showed that 62.4% (*N* = 33) met criteria for remission at the end of treatment, and that 66.0% (*N* = 35) met that criterion at follow-up. Taking the more stringent Clinically Significant Change (CSC) index, 47.6% (*N* = 25) met criteria for remission by the end of therapy, while 61.5% (*N* = 33) met criteria for remission at follow-up.

Discussion

This study has assessed the effectiveness of CBT-T for adults with binge-eating disorder in routine settings. Effectiveness was determined by dimensional changes (with large effect sizes on most measures of pathology) and by three categorical measures of remission. Improvements were shown by session 4, developed further by the end of therapy (session 10), and maintained at three-month follow-up. These outcomes are comparable to those achieved using 20-session versions of CBT-ED for binge-eating disorder (NICE, 2017) and other eating disorders (Fairburn et al., 2009; Byrne et al., 2011; Knott et al., 2015; Raykos et al., 2013), and are similar to those found in transdiagnostic groups of non-underweight patients when using CBT-T (Pellizzer at al., 2019 and Waller et al., 2018).

The proportion of patients who ended at below the commonly used criterion of EDE-Q mean + 1SD (2.77 in the UK) was very high. However, this outcome cannot be treated as indicating remission in a valid way, as many patients began at below that point (due to low EDE-Q Restraint scores). Therefore, such cut-offs should not be treated as meaningful in treatment of binge-eating disorder. Instead, use of the RCI and CSC criteria is critical to understand meaningful change in this patient group.

Overall, CBT-T is a clinically effective and cost-effective therapy for binge-eating disorder, compared to longer forms of CBT-ED. Furthermore, these results were achieved despite COVID-19 and some therapy moving online (though that group is too small to analyse separately). Further research is needed to replicate this finding, and to determine whether greater efficiencies can be achieved through delivering CBT-T in groups, given that NICE (2017) recommended the use of CBT-ED groups for this population. That research should use more meaningful measures of change (RCI and CSC) to ensure that the most effective therapies are recommended to service providers. Clinicians should be encouraged to use the RCI and particularly the CSC criteria in routine practice, to ensure the best remission targets are used.

Ethical statement:

Ethical permission was not sought as the study evaluated existing practice (National Health Service Research Authority, 2011). All patients included in the analysis gave written consent for their outcomes to be used anonymously for review of outcomes.

Data availability statement:

The anonymised data are available to other researchers on reasonable request.

Key practice points:

- Brief CBT is effective in treating binge-eating disorder.
- Remission rates are comparable to those achieved with longer therapies.
- Brief CBT's benefits are maintained into follow-up.
- Clinicians should use more stringent definitions of improvement, which are not influenced by low initial scores on key variables.

Further reading:

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Table 1

Baseline characteristics for the group of patients with binge-eating disorder

Baseline characteristics	**Mean**	**(SD)**
Age (years)	35.24	(12.27)
Body Mass Index (BMI)	35.66	(11.52)
Eating Disorder Examination Questionnaire (EDE-Q) Global	3.28	(1.15)
Eating Disorder Examination Questionnaire (EDE-Q) Restraint	2.01	(1.63)
Eating Disorder Examination Questionnaire (EDE-Q) Eating concerns	3.06	(1.49)
Eating Disorder Examination Questionnaire (EDE-Q) Shape concerns	3.78	(1.41)
Eating Disorder Examination Questionnaire (EDE-Q) Weight oncerns	3.97	(1.38)
Objective bingeing per week	4.76	(3.27)
Patient Health Questionnaire-9 (PHQ9) Depression	12.62	(6.34)
General Anxiety Disorder-7 (GAD7) Anxiety	10.78	(5.61)

N = 53, ITT analysis with multiple imputations

Table 2

Mean eating characteristics over the course of treatment and follow-up, compared using paired t-tests (ITT analyses; N = 53)

	Session 1		Session 4		Session 10		Follow-up		Session 1 to session 10			Session 1 to session 4			Session 10 to Follow-up		
	M	*(SD)*	*M*	*(SD)*	*M*	*(SD)*	*M*	*(SD)*	*t*	*p*	*d*	*t*	*p*	*d*	*t*	*p*	*d*
EDE-Q Global	3.28	(1.15*)*	2.17	(1.24*)*	1.57	(1.22*)*	1.36	(1.42*)*	8.43	<0.001	1.23	6.26	<0.001	0.93	0.97	*NS*	-
EDE-Q Restraint	2.01	(1.63*)*	0.74	(1.12*)*	0.61	(1.31*)*	0.51	(0.75*)*	5.76	<0.001	0.83	5.42	<0.001	0.72	0.59	*NS*	-
EDE-Q Eating concerns	3.06	(1.49*)*	2.09	(1.49*)*	1.11	(1.00*)*	0.88	(1.06*)*	9.23	<0.001	1.29	4.42	<0.001	0.65	1.19	*NS*	-
EDE-Q Shape concerns	3.78	(1.41*)*	3.13	(1.41*)*	2.28	(1.26*)*	1.92	(1.36*)*	6.43	<0.001	0.92	3.43	0.001	0.45	1.44	*NS*	-
EDE-Q Weight concerns	3.97	(1.38*)*	2.95	(1.70*)*	2.15	(1.31*)*	2.08	(1.83*)*	8.08	<0.001	1.14	4.87	<0.001	0.68	0.27	*NS*	-
Objective binges per week	4.76	(3.27*)*	0.76	(1.36*)*	0.49	(1.16*)*	0.51	(0.79*)*	9.49	<0.001	1.28	8.50	<0.001	1.16	-0.09	*NS*	-
Depression (PHQ9)	12.6	(6.34*)*	9.48	(5.45*)*	7.73	(5.10*)*	5.84	(6.04*)*	5.55	<0.001	0.82	3.69	<0.001	0.50	2.37	0.03	0.37
Anxiety (GAD7)	10.8	(5.61*)*	8.92	(5.21*)*	7.68	(5.45*)*	7.30	(4.34*)*	3.76	0.002	0.55	3.08	0.002	0.44	0.54	*NS*	-
Body Mass Index	35.7	(11.5*)*	36.9	(11.1*)*	37.5	(8.78*)*	38.7	(7.36*)*	1.51	*NS*	-	2.25	0.03	0.32	1.02	*NS*	-

Note: EDE-Q - Eating Disorders Examination Questionnaire; PHQ - Patient Health Questionnaire-9; GAD-7 - General Anxiety Disorder-7