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Cognitive-Behavioral Therapy for Adolescents with an Age-Adapted Diagnosis of Binge-Eating Disorder: A Randomized Clinical Trial

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Binge-eating disorder (BED) is characterized by recurrent objective binge eating that occurs in the absence of compensatory behaviors to prevent weight gain. As the most common eating disorder emerging in youth, BED co-occurs with increased eating disorder and general psychopathology, impaired quality of life, and obesity [1]. Despite its clinical significance, there is a dearth of treatment studies in adolescents [1, 2]. Regarding cognitive-behavioral therapy (CBT), the most well-established treatment for adults with BED [2], one pilot randomized-controlled trial (RCT) in 25 adolescent girls with objective binge eating suggested superiority to wait-list (WL) in achieving binge-eating abstinence through 6 months following randomization and in improving eating disorder psychopathology, but not in reducing binge eating or standardized body mass index (BMI; kg/m^2) [3]. Other CBT-related RCTs documented efficacy of Internet-based, weight loss-oriented self-help versus WL [4] and no differences in dialectical behavior therapy versus weight management [5]. Based on this preliminary evidence, the aim of the BEDA (Binge Eating Disorder in Adolescents) study was to provide a confirmatory test of the efficacy of CBT in adolescent BED. It was hypothesized that CBT will be superior to WL in improving binge eating, associated psychopathology, and quality of life, but not BMI, with long-term maintenance of effects.

Methodological details of the BEDA study can be found in Hilbert [6] and online supplementary materials (for all online suppl. material, see www.karger.com/doi/10.1159/000503116). The study, registered and ethically approved, was conducted at Leipzig University Medical Center. Recruitment took place mainly through population- and school-based advertising. Inclusion required age 12–20 years; informed written consent (and assent); and age-adapted diagnosis of BED (DSM-IV-TR, DSM-5) or BED of low frequency and/or limited duration (DSM-5), all based on binge eating (i.e., objective and/or subjective binge eating). Patients were assessed at baseline, 4 months after randomization (post-assessment), and at 6-, 12-, and 24-month follow-up after treatment. The WL group was additionally assessed after delayed CBT. Age-adapted CBT, derived from an evidence-based [7] manual for adults with BED [6], was conducted in twenty 50-min individual sessions with the adolescent over 4 months.

Of 340 adolescents screened for eligibility, 102 were scheduled for an in-person assessment to determine inclusion. Of these, 73 adolescents (15.3 ± 2.5 years, 82% girls) were randomized to CBT ($n = 37$) or WL ($n = 36$) (online suppl. Fig. S1; online suppl. Tables S1, S2). Treatment drop-out (<10 CBT sessions attended) was 32% (9/37 in the CBT arm, 14/36 in the WL arm). Safety of CBT was established (online suppl. Table S3).

Regarding the primary outcome of binge-eating episodes (Eating Disorder Examination), intent-to-treat (ITT) analyses revealed 4.7 ($p = 0.0066$) fewer monthly binge-eating episodes at post-assessment in the CBT versus WL group (Table 1; online suppl. Figs. S2, S3). Regarding secondary outcomes, the CBT group achieved higher rates of abstinence from binge eating (51 vs. 33%) and remission from BED (57 vs. 33%) and a lower eating disorder psychopathology at post-assessment (all $p < 0.05$), while the groups did not differ in depression, self-esteem, quality of life, and standardized BMI (all $p > 0.05$). Longitudinal ITT analyses showed that after CBT, binge-eating episodes remained significantly reduced at 6-, 12-, and 24-month follow-up when compared with baseline ($p < 0.001$; online suppl. Tables S4, S5). Abstinence from binge eating remained stable at about 50%, and remission from BED ranged from 59 to 70% across follow-up. For eating disorder psychopathology, depressive symptoms, self-esteem, and quality of life, significant improvements relative to baseline were revealed at all follow-up time points (all $p < 0.001$), whereas standardized BMI was not significantly changed ($p > 0.05$). Sensitivity analyses confirmed these results (online suppl. Tables S6–S8).

This confirmatory RCT uniquely established the efficacy of individual CBT versus WL in improving binge-eating symptomatology and demonstrated long-term maintenance of effects over 24 months in adolescents with an age-adapted diagnosis of BED. The magnitude of the CBT versus WL effect is consistent with that in adolescent binge eaters [3], but lower than that in adult BED [2]. Adolescents started from lower baseline numbers of objective binge-eating episodes but reached subclinical post-treatment and follow-up numbers (≤2 binge-eating episodes or ≤1 objective binge-eating episode per month), comparable to those in adults with BED [7]. The significant effects of CBT versus WL on binge-eating abstinence and eating disorder psychopathology were consistent with previous evidence [2, 3] and were maintained through long-term follow-up. In contrast, significant improvements in depression, self-esteem, and quality of life were not specific to CBT, similar to evidence on adolescent binge eaters [3], but effects were smaller than those in CBT for adult BED, at least for depression

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Table 1. Intent-to-treat analyses for the primary and secondary outcomes

	Baseline				Post-assessment				Adjusted effect	95% CI	Effect size	*p*
	CBT (*n* = 37)		control (*n* = 36)		CBT (*n* = 37)		control (*n* = 36)					
	mean or *n*	SD or %	mean or *n*	SD or %	mean or *n*	SD or %	mean or *n*	SD or %				
Eating Disorder Examination												
Binge-eating episodes	11.8	9.8	11.2	8.9	1.3	3.1	6.0	8.6	4.7	1.6–7.9	0.35	0.0038
Objective binge-eating episodes	7.9	9.6	7.4	7.4	0.5	1.7	3.6	5.2	3.1	1.3–4.9	0.38	<0.001
Abstinence from binge eating	–		–		19	51	12	33	3.0	1.0–9.8	0.61	0.048
Remission from BED	–		–		21	57	12	33	3.4	1.2–10.4	0.67	0.022
Global eating disorder psychopathology	2.3	0.9	2.2	0.8	1.4	0.9	2.0	0.9	0.7	0.2–1.2	0.34	0.012
Beck Depression Inventory-II	14.3	11.1	15.6	10.1	12.2	14.0	11.9	10.9	–1.2	–7.5–5.1	–0.05	0.69
Rosenberg Self-Esteem Scale	28.1	7.0	27.1	5.6	28.9	9.3	27.9	8.3	0.2	–4.2–4.7	0.02	0.91
SF-12 Mental Quality of Life	44.4	13.8	42.6	14.2	45.9	15.7	42.6	15.3	2.4	–6.6–11.3	0.08	0.59
Body mass index SD score	1.9	0.8	1.9	1.1	2.0	1.0	2.1	1.0	0.1	–0.3–0.6	0.07	0.54

For metric outcomes, positive values of the adjusted effect and effect size *d* indicate superiority of CBT. For categorical outcomes, the odds ratio >1.0, used as effect size, indicates superiority of CBT. BED, binge-eating disorder; CBT, cognitive-behavioral therapy; SF-12, short-form health survey.

[2]. Given adolescents' low baseline level of impairment in these general indicators, a differential improvement may have been unlikely to be achieved. Notwithstanding, these improvements were sustained across follow-up. As in adolescent binge eaters [3] and adult BED [2], standardized BMI did not differ after CBT versus WL and was stabilized over long-term follow-up. Thus, the treatment of binge eating may foster normative growth and prevent excess weight gain, whereas adolescent BED predicted obesity in adulthood [8].

Strengths and limitations of this study include the use of a well-controlled design with low risk of selection and detection bias. As in other psychotherapy trials, blinding of patients and therapists was not possible, contributing to a performance bias. For preventing an attrition bias given the differential loss in CBT versus WL at post-assessment, analyses were conducted by ITT, with sensitivity analyses underscoring the robustness of the results. To avoid a reporting bias, methods had been published previously [6]. To ensure generalizability, exclusion criteria were kept to a minimum. Nevertheless, male patients were underrepresented, and corresponding to the population in the Leipzig region, most adolescents had German nationality, limiting the generalizability to more diverse populations.

Confirming the short-term efficacy of CBT and long-term maintenance of gains, the results support CBT as an evidence-based treatment of adolescent BED, which is essential for its establishment in healthcare systems. Future trials may determine the long-term efficacy of CBT beyond the tendency of BED for spontaneous remission and recurrence [9]; its comparative efficacy, for example, regarding interpersonal psychotherapy [10]; the optimal degree of family involvement given that our approach was adolescent focused; adjunctive interventions to foster weight loss in adolescents with BED and obesity; and the cost-effectiveness of CBT.

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Statement of Ethics

Ethical approval was granted by the Ethics Committee of Leipzig University (235-10-23082010). Informed written assent and consent were obtained from all adolescents and at least 1 parent (for adolescents aged <18 years), respectively.

Disclosure Statement

Dr. Hilbert received royalties for books on CBT of BED and obesity with Hogrefe; honoraria for workshops and lectures on the psychosocial aspects and treatment of BED and obesity; honoraria as editor of the journal *Psychotherapeut*; honoraria as a reviewer from Mercator Research Center Ruhr, Western Sydney University, and Oxford University Press; funds for tangible means from the Danone Foundation; and honoraria as a consultant for Weight-Watchers, Pope Woodhead, GlobalData, Informa Healthcare, and Simon-Kucher and Partners. Drs. Petroff, Neuhaus, and Schmidt have no conflicts of interest to declare.

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Author Contributions

Drs. Hilbert and Petroff had full access to all data in the study and take responsibility for the integrity of the data and the accuracy of data analysis. Study concept and design; obtained funding; study supervision: Dr. Hilbert. Acquisition, analysis, interpretation of data; drafting of the manuscript, critical revision of the manuscript for important intellectual content; administrative, technical, or material support: Drs. Hilbert, Petroff, Neuhaus, and Schmidt. Data analysis: Drs. Petroff, Hilbert, and Schmidt.

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