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**Optimising treatment outcomes in adolescents with eating disorders:
The potential role of cognitive behavioral therapy**

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Running head: CBT-ED FOR ADOLESCENTS

1 **Optimising treatment outcomes in adolescents with eating disorders:**

2 **The potential role of cognitive behavioral therapy**

3 **Abstract**

4 **Objective:** While family based treatment (FBT) is the leading psychological therapy for
5 adolescents with eating disorders, it is not universally effective or suitable. This study
6 considered the effectiveness of cognitive-behavioral therapy for eating disorders (CBT-ED) in
7 adolescent cases where FBT was not fully effective or where it was not applicable to the
8 individual case.

9 **Method:** A transdiagnostic case series of 54 adolescents with eating disorders (52% with
10 anorexia nervosa; 31% with atypical anorexia nervosa) were offered CBT-ED following
11 previous treatment using FBT or following FBT being judged inappropriate. Pre-post outcomes
12 were assessed using standardised measures of eating attitudes and clinical impairment, and
13 weight change was measured for the patients with anorexia nervosa.

14 **Results:** The rate of attrition was similar to that found in other CBT-ED studies (38.9% of
15 patients who started CBT-ED; 59.3% of those offered CBT-ED). The patients showed positive
16 outcomes on all measures, regardless of whether they had previously been treated with FBT.
17 Effect sizes were moderate to large. Severity and duration of the eating disorder were
18 unrelated to outcomes.

19 **Discussion:** CBT-ED merits consideration as a second-line approach for adolescents with
20 eating disorders when FBT has not been effective or could not be applied. There is no
21 evidence that previous failure to benefit from FBT impairs outcome from subsequent CBT-ED,
22 and severity and duration of the eating disorder did not influence outcome. Treatment
23 matching for adolescents with eating disorders might consider the role of previous treatment
24 outcomes and family availability in determining optimum treatment strategies for individuals.

25
26 Keywords: adolescents; Family Based Treatment; cognitive-behavioral therapy; eating
27 disorders; attrition; outcomes; effectiveness

1 **Optimising treatment outcomes in adolescents with eating disorders:**

2 **The potential role of cognitive behavioral therapy**

3 Family based treatment (FBT) is the recommended treatment for adolescent anorexia
4 nervosa, bulimia nervosa, and atypical presentations (National Institute for Health and Clinical
5 Excellence [NICE], 2017), with different variants for anorexic (FT-AN) and bulimic (FT-BN)
6 presentations. It is well-supported by high-quality evidence (Lock, 2015). However, for a
7 significant proportion of adolescents with eating disorders, high levels of eating pathology
8 persist following FBT. Others are unable to engage with FBT, often due to parental
9 disengagement or the adolescent not wanting parents to be involved in their treatment.

10 In the event that FBT is not applicable to the individual case, is unacceptable to the
11 patient, or is ineffective, cognitive behavioral therapy for eating disorders (CBT-ED) has been
12 identified as an evidence-based second-line treatment (NICE, 2017). CBT-ED has a strong
13 recovery rate among adults with eating disorders, particularly for non-underweight individuals
14 (NICE, 2017). Dalle Grave et al. (2013, 2014, 2015) have shown that CBT-ED is also effective
15 with adolescents, particularly where their pre-therapy body weight is higher and where they
16 have had the eating disorder for a shorter period of time. It remains to be fully determined how
17 effective CBT-ED is for adolescents when carried out in routine clinical settings, as has been
18 demonstrated for adults (NICE, 2017).

19 Before one can determine whether CBT-ED is useful for adolescents in routine
20 practice, it will be important to consider the conditions under which CBT-ED was implemented,
21 given the clinical circumstances outlined above. First, is CBT-ED effective if it is implemented
22 following FBT or as an adjunct, where the FBT has not enabled full recovery? Second, is CBT-
23 ED effective if it is used instead of FBT (e.g., due to parental absence or patient refusal to
24 involve family)? Neither of these conditions is likely to be based on random events in the young
25 person's life, but both of these questions require consideration to guide future clinical practice.

26 While it is clear that FBT has the strongest evidence base for younger people with
27 eating disorders, no therapy is effective for everyone, so the role of second-line therapies
28 should be considered. Therefore, the aim of this study was to determine the role of CBT-ED

1 as a second-line therapy for adolescents with eating disorders. who have not proved suitable
2 for or fully responsive to FBT. As such, a case series design in a routine clinical setting was
3 the most relevant approach. The study will address the hypothesis that CBT-ED is suitable for
4 such cases, producing clinical improvements in weight (among anorexia nervosa patients),
5 eating attitudes and clinical impairment. Potential predictors of attrition and level of treatment
6 response will be considered, particularly to determine whether levels of severity and duration
7 of the disorder influence outcomes. Such links have been suggested under the construct of
8 'severe and enduring' eating disorders (e.g., Hay & Touyz, 2015), although the validity of that
9 construct has been challenged in terms of both coherence (e.g., Wildes et al., 2017) and
10 clinical utility (e.g., Calugi et al., 2017; Raykos et al., 2018).

11 **Method**

12 **Ethics**

13 Under NHS ethics arrangements, this work was not considered to be research, but
14 routine service evaluation, as all elements of treatment and assessment were conducted as
15 part of existing practice. Therefore, it did not require ethical clearance. However, all patients
16 were informed that collected clinical information might be used (in anonymised form) for
17 service-level research, and gave explicit consent for their data to be used in this way.

18 **Participants**

19 The participants were 54 UK adolescents (52 female; 2 male) who had received a
20 diagnosis of an eating disorder and had been referred for treatment in a Child and Adolescent
21 Mental Health Services team with specialist eating disorder therapist provision. They came
22 from a wider case series referred to the service, but those who undertook FBT and needed no
23 further intervention are not included in this sample. Of the 54 patients, 32 had previously
24 undertaken FBT, without full recovery. Those 32 represented 22.2% of the patients who had
25 been treated using FBT (N = 144). The remaining 22 had not received FBT, due to failure to
26 accept or engage with that treatment. Therefore, this sample of 54 was drawn from an initial
27 sample of 166 referred patients. To summarise, FBT had been judged suitable for 87% of
28 those who had been offered it, and was reported to be effective in 78% of those who had been

1 offered it, but it was judged unsuitable at assessment for 13%. Therefore, it can be concluded
2 that FBT was seen as a valuable first line treatment for most patients, but it was not universally
3 applicable or clinically effective.

4 Their mean age was 15.5 years (SD = 1.36; range = 13-18 years). Their mean length
5 of illness prior to CBT-ED was 24.7 months (range = 4-96 months), and their mean waiting
6 time from referral to CBT-ED to first offered therapy appointment was 48.4 days (SD = 37.3).
7 All eating disorder presentations are treated as priority cases within this service and are
8 assessed by a mental health clinician in the first instance.

9 Of the 54 patients, 28 (52%) had a diagnosis of anorexia nervosa, 17 (31%) met criteria
10 for atypical anorexia nervosa, eight (15%) had a diagnosis of bulimia nervosa, and the
11 remaining one person (2%) had a diagnosis of atypical bulimia nervosa. The mean number of
12 sessions attended was 14.2 (range = 1-46), with a mean of 22.0 for the therapy completers
13 (range = 6-46).

14 **Measures**

15 Clinical data were collected as routine practice, including diagnosis, weight, duration
16 of disorder. Each patient was asked to complete the following questionnaires at the beginning
17 and end of therapy, as routine clinical outcome measures:

18 **Eating Disorder Examination Questionnaire (EDE-Q; Fairburn, 2008).** This
19 questionnaire addresses eating attitudes in four domains - eating concern, restraint, weight
20 concern and shape concern. The global score was used here. Among adults, a global score
21 of 2.77 is used as a clinical 'cut-off', reflecting meaningful clinical change, though this cut-off
22 is less well established in younger populations.

23 **Clinical Impairment Assessment Questionnaire (CIA; Fairburn, 2008).** The CIA
24 addressed psychosocial impairment as a consequence of an eating disorder, and can be used
25 to reflect quality of life. A score of 16 can be used as a clinical 'cut-off'.

26 **Intervention**

27 For those patients who had previously had FBT, it was delivered via a team of FBT-
28 trained clinicians, based on the use of the relevant treatment manual (Lock & Le Grange,

1 2013; Le Grange & Lock, 2007). Clinical supervision was provided via online meetings with
2 clinicians at Stanford University.

3 For all patients, CBT-ED was delivered by combining core interventions from Fairburn
4 and Waller et al.'s treatment manuals (2007, 2008), adjusted to meet the developmental stage
5 of the young person. Family involvement occurred when indicated and if the adolescent was
6 agreeable to this. Sessions primarily followed the format of manualised CBT-E (Fairburn,
7 2008), though without the proposed twice-weekly initial sessions. It was also adapted when
8 other maintaining factors (primarily early trauma experiences and associated responses,
9 requiring safety and stabilisation) posed a barrier to directly targeting weight, shape and
10 control concerns. All CBT-ED was delivered by a single clinician (MC), This therapist was a
11 qualified nurse, who was trained in CBT to postgraduate diploma level and was an accredited
12 CBT clinician with 15 years of experience of working with eating disorders (six years as a CBT
13 therapist). In addition to her core CBT training, she was trained specifically in CBT-E and other
14 forms of CBT-ED (Waller et al., 2007). She received regular CBT-specific clinical supervision
15 via a clinical psychologist working in a specialist eating disorders team.

16 **Data analysis**

17 Weight, EDE-Q Global and CIA scores were recorded at the beginning and end of
18 treatment. Potential factors resulting in attrition were tested by comparing levels of such
19 factors (e.g., duration of disorder, initial weight, diagnosis) across completers and non-
20 completers (using t-tests and X^2 tests). Pre-post differences were tested using paired t-tests,
21 and effect sizes were calculated as Cohen's d for within-subject t-tests. To ensure that attrition
22 did not bias outcomes, intention to treat analyses were used. Missing values were addressed
23 using multiple imputation (five iterations). SPSS v.24 was used for all analyses. Finally,
24 correlations were used to determine whether the severity of anorexia nervosa (lower weight
25 at beginning of treatment) or its duration (months from onset of anorexia nervosa) were
26 associated with the level of weight gain in CBT-ED. Finally, the potential impact of duration of
27 the eating disorder was considered categorically (up to three years vs longer than three years)
28 using t-tests.

Results

Predictors of attrition

Of the 54 patients who were offered CBT-ED, 18 failed to engage and did not take up the treatment. Of those who took up the treatment, 14 started therapy but did not complete it, and 22 completed CBT-ED (an attrition rate of 38.9% among those who started CBT-ED, and a loss to therapy rate of 59.3% of those who were initially offered the treatment). The groups were compared on initial characteristics, using one-way ANOVAs, in order to determine whether there were any pre-treatment predictors of attrition. There was no difference in percentage expected weight for height at the outset (Non-starters - $M = 94.9\%$, $SD = 12.0$; Non-completers - $M = 97.4\%$, $SD = 12.0$; Completers - $M = 96.8\%$, $SD = 10.8$; $F = 0.21$, NS). Nor was there any difference in pre-treatment duration of the disorder (Non-starters - $M = 23.6$ months, $SD = 19.6$; Non-completers - $M = 19.7$ months, $SD = 11.4$; Completers - $M = 28.8$ months, $SD = 24.5$; $F = 0.90$, NS). The association of diagnosis (anorexia nervosa, atypical anorexia nervosa, bulimia nervosa) and completer status was tested using a chi-squared analysis. There was no association between diagnosis and completer status ($X^2 = 4.722$, $df = 4$, NS). To summarise, initial diagnosis, severity and duration of the eating disorder were all unrelated to attrition.

Impact of CBT-ED for the whole clinical group

The data were analysed for all 54 who were offered treatment, using Intention to Treat analyses (multiple imputation method). Table 1 shows that the adolescents' eating pathology (EDE-Q Global score) and clinical impairment levels (CIA scores) reduced significantly and substantially following therapy, with moderate to large effect sizes on all scales. EDE-Q subscale scores all showed the same pattern of significant change and moderate to large effect sizes. Both the EDE-Q Global and CIA scores fell below the suggested cut-off scores for the scales following therapy.

Insert Table 1 about here

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We also considered increases in percentage expected weight for height in the patients with anorexia nervosa or atypical anorexia nervosa who started therapy (regardless of completer status). One-tailed tests were used, to reflect the predicted direction of change. For these patients as a whole, weight rose from 51.8kg (SD = 6.18) to 54.1kg (SD = 6.16). Mean percentage expected weight for height rose significantly (paired $t = 3.07$, $P = .002$, Cohen's $d = 0.456$) from 96.6% (SD = 11.3) to 98.7% (SD = 10.3). This pattern was similar for those with anorexia nervosa (mean initial score = 98.7%; SD = 12.0; mean initial score = 101.7%; SD = 10.9; paired $t = 2.44$, $P < .014$; Cohen's $d = 0.606$) and atypical anorexia nervosa (mean initial score = 95.5%; SD = 11.0; mean initial score = 97.1%; SD = 9.69; paired $t = 1.97$, $P < .03$; Cohen's $d = 0.359$).

Impact of CBT-ED for adolescents who had not reached full recovery from FBT

Thirty-two adolescents had previously been treated using FBT. Data were analysed for all 32, using Intention to Treat analyses (multiple imputation method). Table 1 shows that the outcomes for this sub-group were very similar to those for the group as a whole, with significant reductions in eating attitudes and clinical impairment and moderate to large effect sizes.

Impact of CBT-ED for adolescents who were not suitable for FBT

The remaining 22 adolescents were offered CBT-ED without having undertaken FBT, as detailed above. As with the other subgroup, their outcomes were very similar to those for the group as a whole, with significant reductions in eating attitudes and clinical impairment and moderate to large effect sizes (Table 1).

Correlates of weight gain in patients with anorexia nervosa

Pearson's coefficients were used to determine whether clinical variables were correlated with the level of weight gain among anorexia nervosa patients. Initial weight, pre-treatment duration of the eating disorder and number of treatment sessions were tested for any association with weight gain for the two subgroups (anorexia nervosa; atypical anorexia nervosa). None of the three potential predictors were significantly associated with weight gain

1 in either subgroup ($r < \pm .451$, $P > .14$ in all cases).

2 There is some evidence that family therapy is more effective among individuals who
3 have a history of anorexia nervosa lasting less than three years (Russell et al., 1987), but
4 illness duration does not appear to be related to CBT outcome (e.g., Calugi et al., 2017;
5 Raykos et al., 2018), we also considered the possibility that there would be a categorical
6 difference in weight gain between those patients who had had their anorexic disorder for more
7 or less than three years. Those who had had their anorexic disorder for no more than three
8 years gained a mean of 1.52 kg (SD = 3.08), compared with the mean weight gain of 1.59 kg
9 (SD = 2.23) among those with a duration of over three years. These levels of weight gain were
10 unrelated to duration of disorder ($t = 0.07$, $P = 0.947$). Considering all the treatment
11 completers, the mean reduction in EDE-Q scores for those who had had their eating disorder
12 for up to three years was 2.01 (SD = 1.25), while it was slightly lower for those whose eating
13 disorder was of longer duration ($M = 1.48$, $SD = 0.72$), but this difference did not approach
14 significance ($t = 1.07$, $P = .295$).

15 Discussion

16 This study has examined the effectiveness of CBT-ED for a transdiagnostic group of
17 adolescents with eating disorders, to determine whether it is a viable approach for young
18 people who have previously been unable to benefit fully from FBT or for individuals who were
19 not suitable for FBT. There were moderate to large positive outcomes across the whole group
20 in terms of weight gain, eating attitudes and clinical impairment, as would be expected. More
21 importantly in terms of the clinical questions addressed here, those outcomes were similar
22 whether or not the patient had previously been offered FBT. The groups started CBT-ED with
23 similar levels of eating pathology and clinical impairment, and ended with substantial
24 reductions, including showing a reduction in mean scores that crossed suggested clinical cut-
25 offs. In each group, the effect sizes were large for reductions in eating attitudes and moderate
26 for reductions in clinical impairment. Weight gain also showed positive gains.

27 This was a case series study, conducted in a routine clinical setting. As such, it had a
28 number of limitations that need to be considered when interpreting the findings. In particular,

1 the lack of any control group (e.g., comparison of outcomes of patients randomised to entering
2 CBT vs FBT) means that one cannot reach firm conclusions about the suitability of CBT-ED
3 for this group. It is also important to note that the findings reflect clinical outcomes from a
4 single clinician, and that this limitation means that one cannot exclude the possibility of
5 variance in therapist effects. Finally, the lack of adherence measures is a further limitation that
6 should be addressed in future work.

7 The results of this effectiveness study were comparable with those from efficacy
8 studies of FBT and CBT-ED when used for adolescents with anorexia nervosa and bulimia
9 nervosa (e.g., Dalle Grave et al., 2013; Lock, 2015). The pattern of findings was also
10 comparable with that found in other effectiveness studies of CBT-ED when used with a range
11 of age and diagnostic/transdiagnostic samples (e.g., Byrne et al., 2011; Calugi et al., 2015;
12 Dalle Grave et al., 2013, 2014; Turner et al., 2015). Thus, the current findings add to the
13 evidence that the results of RCTs can be extended to routine clinical practice, as long as the
14 therapy is delivered appropriately. However, the attrition rate needs to be considered in all
15 such efficacy studies. The rate here (38.9%) was very similar to the 36.9% reported by Calugi
16 et al. (2015) for adolescents undertaking CBT-ED. Given this consistency, it could be argued
17 that the next stage in the development of effectiveness studies should be the development of
18 strategies to reduce attrition rates.

19 While these findings do not address the issue of FBT's superiority over CBT-ED in
20 treating younger patients with eating disorders, they give strong support for the use of CBT-
21 ED where FBT has not been fully effective or where it cannot be implemented. Such cases
22 might include those where: the young person is unable to take back responsibility for eating
23 and is unable to progress to phase two of FBT; distress tolerance skills have not been learned
24 (e.g., shame or guilt in the context of a trauma history); or the family/young person choose not
25 to engage in FBT or are not available.

26 In keeping with other literature on CBT-ED outcomes (e.g., Calugi et al., 2017; Raykos
27 et al., 2018), there was no evidence that severity or duration had any link to outcomes, whether
28 addressed dimensionally or categorically (unlike family therapy – Russell et al., 1987).

1 Therefore, CBT-ED can be seen as a good secondary option to FBT regardless of patient
2 diagnosis or other illness characteristics. However, these findings indicate that treatment
3 matching for such cases needs substantial further investigation. Whereas previous treatment
4 matching guidance has tended to differentiate younger cases (adolescents) from older cases
5 (adults), these findings and those of Calugi et al. (2015) indicate that it might be possible to
6 refine those recommendations to include the motivational and social situation of the patient
7 (e.g., willingness to participate in family treatment; family availability). In the same vein, it is
8 possible that some adult cases might benefit from the implementation of FBT (e.g., where still
9 living with others, who are accommodating the disordered eating patterns). Further research
10 into the issue of such treatment matching would be needed to determine the parameters that
11 clinicians might consider.

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Table 1

Impact of CBT-ED on a transdiagnostic group of adolescents with eating disorders, using Intention to Treat analyses

	Start of treatment		End of treatment		Correlation R	Paired t-test		
	Mean	(SE)	Mean	(SE)		t	P	<i>Cohen's d</i>
Total clinical sample (N = 54)								
EDEQ Global	3.35	(0.22)	1.29	(0.34)	.321	5.89	.001	0.821
CIA Total	25.5	(1.66)	11.2	(2.82)	-.031	4.50	.001	0.588
Patients who had received FBT (N = 32)								
EDEQ Global	3.30	(0.28)	1.58	(0.43)	.472	3.99	.001	0.793
CIA Total	25.5	(2.30)	12.6	(3.60)	.075	3.21	.004	0.552
Patients who had not received FBT (N = 22)								
EDEQ Global	3.42	(0.40)	0.86	(0.63)	.144	3.99	.001	0.785
CIA Total	25.6	(2.94)	9.11	(4.95)	-.212	3.10	.003	0.561