Title: A Case Series of Family-based Treatment for Adolescents with Atypical Anorexia Nervosa

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Abstract

Objective: The aim of this case series was to examine engagement in and outcomes of family-based treatment (FBT) for adolescents with DSM-5 Atypical AN, that is, adolescents who were not underweight at presentation. **Method:** Consecutive referrals for FBT of adolescents with Atypical AN to a specialist child and adolescent eating disorder program were examined. Engagement in treatment (i.e., dose of treatment, completion rate), and changes in psychological symptomatology (i.e., eating disorder symptoms, depressive symptoms, self-esteem, obsessive compulsiveness), weight, and menstrual function were examined. The need for additional interventions (i.e., hospitalisation and medication), and estimated remission rates were also examined. **Results:** The sample comprised 42 adolescents aged 12-18 years (88% female). Engagement in FBT was high, with 83% completing at least half the treatment dose. There were significant decreases in eating disorder and depressive symptoms during FBT ($p < .05$) but no improvement in self-esteem. There was no significant change in percent of median BMI for age and gender for the sample as a whole (105% vs. 106%, $p = .128$). However, adolescents who were not admitted to hospital prior to FBT gained some weight ($M = 3.4$kg) while those who were admitted did not gain weight during FBT ($M = 0.2$kg, $p < .01$). The overall remission rate ranged from 38% to 52% depending on the criteria applied. **Discussion:** FBT appears to be an effective treatment for adolescents with Atypical AN. However, more research is needed into systematic adaptations of FBT and other treatments that could improve overall remission rates.

Keywords: Anorexia nervosa; eating disorders; adolescents; family therapy; effectiveness

Atypical Anorexia Nervosa (AN) represents a significant proportion of adolescents with restrictive eating disorders (1-3) with a striking increase in this type of presentation observed over the past decade (3). Adolescents with Atypical AN have all the cognitive, emotional, and behavioural features of AN but, despite significant weight loss, they are not underweight (4). Our research shows that compared to adolescents with AN who are underweight, adolescents with Atypical AN are just as medically unwell, have similar rates of psychiatric comorbidity, and report greater distress about eating and body image (3, 5). The identification of effective treatments for this population is therefore of great importance.

A potential suitable treatment for adolescents with Atypical AN is family-based treatment (FBT), an outpatient therapy for medically stable adolescents with AN (6). To date, FBT has the strongest evidence of efficacy for adolescent AN (7). Clinical trials indicate that, depending on the criteria applied, between 22% and 90% of adolescents have positive outcomes at the end of treatment (8, 9), which is typically maintained 4-5 years following treatment (10-12). The initial focus of FBT is on parents taking charge of their child's eating to restore them to a healthy weight; however, concomitant improvements are also observed in AN cognitions (e.g., body dissatisfaction and overvaluation of shape and weight), mood, and self-esteem (13).

Over time, FBT has been adapted for several eating and weight disorders including bulimia nervosa (14), prodromal AN (15), Avoidant Restrictive Food Intact Disorder (16), and pediatric overweight (17). Although some studies have included children and adolescents with subthreshold forms of AN (18-20), it is unknown to what extent this treatment is suitable for adolescents with DSM-5 Atypical AN. This is important given that immediate weight gain is a key focus of FBT, while the need for weight gain in medically stable adolescents with Atypical AN remains unclear (5). In addition, parental engagement in the treatment of Atypical AN may be more difficult to achieve. In FBT for adolescents with AN, awareness of

the life-threatening risks associated with malnourishment is utilized by the FBT clinician as an important catalyst for parental intervention. It may be more difficult to engage families in treatment if parents perceive these physical risks as less severe or less imminent in adolescents with Atypical AN.

Given uncertainty about the applicability of FBT in Atypical AN, this case series aimed to describe engagement in and outcomes of FBT in a sample of consecutively referred adolescents with Atypical AN. Specifically, we aimed to examine treatment engagement (i.e., dose of treatment, completion rate), and changes in psychological symptomatology (i.e., eating disorder symptoms, depressive symptoms, self-esteem, obsessive compulsiveness), weight, and menstrual function. The need for additional interventions (i.e., hospitalisation and medication) was also examined. Finally, remission rates were estimated.

Method

Setting

The study took place at a specialist child and adolescent eating disorders program. This tertiary multidisciplinary program provides inpatient and outpatient medical management and outpatient mental health care to children and adolescents with eating disorders, primarily AN. All patients undergo a multidisciplinary assessment prior to commencing outpatient treatment that includes clinical evaluations by a psychiatrist, paediatrician, dietician, nurse, and FBT therapist. Patients also complete battery of standardized clinical assessments at intake and post-treatment. Standardized assessments at intake were introduced as routine clinical care in 2010, and post-treatment standardized assessments became routine from 2012. The mainstay of the outpatient mental health care provided is FBT, which is delivered by specialist mental health clinicians in a dose of 18 sessions over 6 months. Treatment can be extended by 3

months for complex cases. During FBT, patients are required to suspend any additional mental health interventions with external providers.

Participants

The sample consisted of consecutive first presentations to the outpatient service between July 2010 and December 2014. Of 286 adolescents assessed during this period, 42 met DSM-5 criteria for Atypical AN (see below) and were referred to FBT. All completed intake standardized assessments, and 25 (71%) of the 35 eligible families completed the post-treatment assessments. The study was approved by the Royal Children's Hospital Human Ethics Research Committee. A waiver of written informed consent was approved by the ethics committee.

Measures

The standardized diagnostic assessment battery comprised separate adolescent and parent semi-structured interviews. Adolescents completed the Eating Disorder Examination (EDE; 21), Mini International Neuropsychiatric Interview (MINI; 22), Yale-Brown-Cornell Eating Disorder Scale (YBC-EDS; 23), and Children's Yale-Brown Obsessive Compulsive Scale (CYBOCS; 24). Parents completed the parent-report versions of the EDE (25, 26) and MINI (22). Adolescents also completed written questionnaires including the Children's Depression Inventory (CDI; 27), and the Rosenberg Self-esteem Scale (RSE; 28). Weight (measured to the nearest 50g), height (measured to the nearest 1mm), menstrual status, and presence of binge eating and purging in the past week were assessed at presentation, at commencement of FBT, and post-treatment.

Diagnosis of DSM-5 Atypical AN was based on parent and adolescent reports on the EDE and height and weight measurements at presentation. Table 1 shows the full diagnostic

algorithm used to identify cases among all adolescents assessed during the study period. This algorithm was used in a previous study comparing the presenting characteristics of adolescents with Atypical AN and full threshold AN (5). In the absence of specified cut-offs in the DSM-5 for "significantly low weight" and "significant loss of weight", adolescents with Atypical AN were defined as those who had lost at least 10% of body weight and were ≥ 90% of median body mass index (mBMI) for their age and sex (29). These cut-offs were selected based on the Society for Adolescent Health and Medicine clinical guidelines for classifying malnutrition in the context of eating disorders (30). For criteria related to the EDE and PEDE, it was required that either or both the parent and adolescent endorse the criterion. Premorbid weight was based on a combination of adolescent self-report, parent report, and clinician report (e.g., previous healthcare providers).

Outcomes were engagement in FBT (i.e., length and dose of treatment), reduction in eating disorder symptoms as measured by the EDE, reduction in psychological symptoms (i.e., CDI, RSE, YBC-EDS and CYBOCS), absence of binge eating and purging, return of menses, and change in weight. Hospitalisations and medication use during FBT were also examined. Remission was examined in two ways. First, remission was defined as ≥ 95%mBMI and EDE Global Score within one standard deviation of community norms. This is the criteria applied in recent clinical trials of FBT for AN (31, 32) including one conducted at the service from which the current sample was sourced (8). Second, remission was assessed with regard to diagnostic status based on parent and adolescent reports on the EDE and height and weight measurements post-treatment; that is, the same criteria used to identify cases in this and a previous study (5) (see Table 1).

Statistical Analysis

Descriptive statistics of the participants at presentation were calculated. Length of FBT and number of sessions were examined, and completers and non-completers were compared on all baseline measures using t-tests. Baseline and post-treatment measures of eating disorder and other psychological symptoms and weight were compared using repeated-measures ANOVAs for continuous variables and McNemar tests for categorical variables. Differences in weight gain by hospitalisation status at presentation were explored using ANOVAs. An intention-to-treat approach was used whereby all participants were included regardless of treatment completion. The proportion of participants hospitalised during FBT, mean days in hospital during FBT and proportion on medication were calculated. Finally, the proportion of adolescents remitted post-treatment was calculated along with the proportion meeting diagnostic criteria for eating disorders.

Results

Table 2 presents the demographic characteristics of the 42 participants. Most were female (88%) and all were aged between 12 and 18 years. All except two were in the healthy weight range at presentation (BMI 5^{th}-85^{th} percentile), but almost two-thirds (64%) had been premorbidly overweight or obese (BMI $\geq 85^{th}$ percentile). More than half of post-menarcheal females presented with menstrual irregularity (54%), of whom three-quarters were amenorrheic at presentation. Purging (41%), and psychiatric comorbidity (33%) were common, and half of the adolescents were admitted to the medical ward prior to starting outpatient FBT, primarily for medical instability.

[Insert Table 2 here]

Engagement in FBT

Treatment engagement as indicated by treatment length and dose is shown in Table 3. On average, families received 14 sessions over 20 weeks. Seven families withdrew from treatment before they had completed at least half the standard dose of 18 sessions (hereafter referred to as non-completers). Of the 35 (83%) who completed treatment, 5 received an extended dose of treatment (i.e., more than 18 sessions). The only differences in baseline assessment measures between completers and non-completers were that completers had a significantly higher mean YBC-EDS total score compared to non-completers (16.85, *SD* = 7.55 vs. 5.60, *SD* = 9.86; *t(*33) = -2.99, *p* = 0.005, Cohen's *d* = 1.28), and completers were more likely to present with menstrual irregularity (61% vs. 17%, χ^2 (1) = 4.03, *p* = .045).

[Insert Table 3 here]

Changes in Symptomatology

Changes in eating disorder symptoms and other psychological symptoms are shown in Table 4. There were significant reductions in all EDE subscale scores, days of driven exercise, YBC-EDS Total score, and CDI score (all p values < 0.05). There were no significant changes in CYBOCS or RSE scores. Prevalence of purging reduced significantly from baseline to post-treatment (p < .01). Prevalence of binge eating was not significantly reduced although binge eating was uncommon.

Change in Menstrual Status

Change in menstrual status is also shown in Table 4. There was a significant reduction in the overall prevalence of amenorrhea (*p* < .05) as well as the broader category of menstrual irregularity (*p* < .05). Of the 16 females with amenorrhea at presentation, 12 (75%) had return of menses during the 6 months of FBT. There were 3 new cases of amenorrhea post-

treatment, 2 of whom had menstrual irregularities at presentation which progressed to secondary amenorrhea during treatment.

[Insert Table 4 here]

Change in Weight

Weight (measured in kilograms, BMI, and %mBMI) at presentation, baseline and post-treatment is shown in Table 5. Baseline weight was recorded after discharge for those admitted to hospital prior to starting outpatient FBT. There was an increase in kilograms and BMI from baseline to post-treatment, but no significant change in %mBMI. There was individual variation in weight change, ranging from a loss of 10.4kg (22.5%mBMI) to a gain of 13.7kg (21.5%mBMI). This individual variation is shown further in Figure 1, which depicts individual changes in %mBMI from baseline to post-treatment, with markers indicating the presenting weight of those admitted to hospital prior to FBT. As can be seen, two participants had large decreases in %mBMI with one entering the underweight range. One participant had a large increase in weight. This latter participant did not report binge eating during treatment, and was not on psychotropic medication.

Given that half the sample had been hospitalised at presentation (i.e., before starting FBT), differences in weight gain during FBT by hospitalisation status were explored (see Table 4). At presentation, there was no significant difference in %mBMI between hospitalised participants and non-hospitalised participants ($F(1,42) = 0.58$, $p = .449$). Admitted adolescents had a mean length of stay of 14.2 days ($SD = 5.7$; range = 9 to 31 days), and gained a mean 2.21kg ($SD = 2.09$; range -1.45kg to +8.15kg) during hospitalisation. Subsequently, at the start of FBT (i.e., baseline/post- hospitalisation), the %mBMI of hospitalised participants was significantly higher than non- hospitalised participants ($F(1,42) = 4.55$, $p = .039$). Hospitalised participants then had no significant

change in weight measures from baseline to post-treatment, while participants who were not hospitalised had a significant increase in weight during FBT (*p*s < .01). Post-treatment, there was no significant difference in %mBMI between hospitalised and non- hospitalised participants ($F(1,42) = 0.04$, $p = .841$). In sum, while the two groups presented at a similar weight, hospitalised participants gained weight during their hospitalisation. They subsequently started FBT at a higher weight and gained less weight during FBT ($M = 0.2$kg $SD = 3.5$) compared to non-hospitalised participants ($M = 3.4$kg, $SD = 3.8$; $F(1,42) = 7.93$, $p = .008$).

[Insert Table 5 and Figure 1 here]

Hospitalisations and Medication During FBT

Nine participants (21%) were admitted to the inpatient medical ward during FBT for a total of 14 admissions, predominantly for medical instability. All 9 participants had also been hospitalised at presentation prior to commencing outpatient FBT. The mean length of stay was 10.1 days ($SD = 3.0$) and ranged from 4 to 18 days. The mean total days spent in hospital for these participants was 15.7 days ($SD = 8.4$) and ranged from 7 to 32 days.

At presentation, two participants (5%) were on psychoactive medication. An additional 9 (21%) started medication during FBT. Of those who started a course of pharmacotherapy, 6 were prescribed an antidepressant, 1 was prescribed an antipsychotic, and 2 were prescribed both an antipsychotic and an antidepressant.

Remission Rates

Remission rates were estimated in two ways using EDE responses and height and weight measures post-treatment as described above. First, applying criteria for remission used by previous clinical trials of FBT for AN, 52% were classified as remitted. Second, applying the

algorithm for DSM-5 diagnoses, 37.5% did not meet criteria for any eating disorder, 37.5% continued to meet criteria for Atypical AN, and 25% met criteria for Unspecified Eating or Feeding Disorder. This latter group comprised adolescents who used some compensatory behaviours such as purging or driven exercise, or experienced some body image disturbance.

Discussion

This is the first study to report outcomes of FBT in a sample of adolescents with DSM-5 Atypical AN. Other case series have combined individuals diagnosed with DSM-IV Eating Disorder Not Otherwise Specified (i.e., including individuals who did not meet diagnostic criteria for AN for reasons other than weight), and individuals with AN who were underweight or partially weight restored (18-20). This case series demonstrates that FBT is a feasible treatment for medically stable adolescents with atypical AN. Families engaged well in FBT, and most did not require additional intervention by way of medical hospitalisation or psychiatric medication. There were significant improvements in disordered eating cognitions and behaviours post-treatment, despite little increase in weight. In addition, although this was not a comparison study, the findings indicated that when the same criteria are applied, the remission rate is similar, or even superior, to that reported in recent clinical trials of FBT for adolescent AN (i.e., 22%-42% (8, 31, 32)).

Given the focus of FBT on weight restoration, it is noteworthy that there was little overall change in average weight over the course of treatment. However, examination of hospitalised and non-hospitalised participants identified that adolescents who were not hospitalised at presentation gained some weight during FBT (M = 3.4kg). This was in contrast to hospitalised adolescents who gained some weight during their admission (M = 2.2kg), but did not gain a significant amount of weight during outpatient FBT (M = 0.2kg). Of interest, there was no difference in %mBMI between these two groups at presentation to

the service or post-treatment. These results suggest that adolescents who present with Atypical AN may follow two pathways of care, each leading to similar weight outcomes. Nonetheless, the amount of weight gain in each group was small in the context of normal adolescent growth and in comparison to the amount of weight typically gained by adolescents with AN in FBT (13, 33).

Of importance, over the course of treatment, there were significant reductions in eating disorder symptoms and behaviours as well as a reduction in depressive symptoms. There was no significant change, however, in self-esteem or general obsessive compulsiveness. These findings are consistent with previous research which suggests that depression may be a consequence of AN (e.g., a starvation effect) which improves as eating and nutrition improve, while anxiety conditions including obsessive compulsive tendencies tend to pre-date onset of AN and persist after recovery (34). Thus, it may be that following FBT some adolescents with Atypical AN will require additional intervention targeting anxiety and low self-esteem in order to address these issues and reduce risk of relapse.

The reduction in symptoms during FBT is a promising sign for treatment of Atypical AN. However, assessing the overall success of treatment for Atypical AN is complex given that criteria for remission are less clear than that for AN with its necessary focus on rapid weight restoration. A remission rate of 52% was obtained using criteria from previous research on FBT for AN which combines weight recovery and cognitive recovery. However, the applicability of weight recovery is contentious given that, by definition, all participants met the weight recovery criterion (>95%mBMI) at diagnosis. We therefore applied a second approach, which used the diagnostic criteria we had defined for case identification. This approach resulted in a 37.5% remission rate, which increased to 62.5% if adolescents with only residual symptoms (i.e., Unspecified Eating or Feeding Disorder) were included. Overall, these results are promising in light of previous studies of FBT for adolescents with

AN, as well as other psychosocial treatments for AN (7). However, more research is needed to determine the best approach for assessing good outcome in this population.

An important question is whether weight gain rather than stabilization of weight is required to achieve full cognitive recovery in those with Atypical AN. For example, it is possible that partial or even full weight restoration (i.e., to the premorbid state) for adolescents >100%mBMI may improve remission rates. Our experience is that healthcare providers and families are reluctant to consider this option given the long-term risks of overweight and obesity. In that regard, findings from this case series could be viewed as reassuring, as they indicate that FBT can reduce eating disorder symptoms in the absence of major weight gain. Having said this, the sample size was modest with insufficient power to reliably examine relationships between weight change (weight gain versus stabilization) and cognitive and emotional recovery. A further question that arises from this study is when, if ever, should weight management interventions aimed at weight loss be introduced for adolescents with Atypical AN who remain overweight or obese following treatment, given the need to balance longer term health concerns with the risk of relapse.

This study provides important preliminary evidence for the effectiveness of FBT for adolescents with Atypical AN, and presents some strengths, but also several limitations. In terms of strengths, the use of gold-standard assessments measures and a relatively large sample of a new DSM-5 diagnosis are particularly noteworthy. That said, a larger sample size is needed to confirm the study findings and to allow for more complex analyses such as moderators and mediators of treatment outcomes. In addition, a longer follow-up period would provide important information about sustained effects, risk for relapse, and the persistence of emotional and psychiatric comorbidities such as anxiety and low self-esteem. Use of retrospective reports of premorbid weight was also a limitation. While some adolescents had historical weight records from previous healthcare providers, many relied on

retrospective recall by the adolescent or their parents. This may have affected the accuracy of premorbid weight and degree of weight loss as analysed. With regard to differential diagnoses, it should be noted that for the purpose of this study, Atypical AN took precedence over other diagnoses within the 'Other Specified Feeding or Eating Disorder' section (see Table 1). In this sample, three cases also met criteria for bulimia nervosa of limited frequency/duration and three cases also met criteria for purging disorder. While restrictive eating and weight loss does not exclude these alternative diagnoses, the extent of weight loss (M =18.2%, SD =8.3) and subsequent treatment approach suggested they were suitably classified as Atypical AN for the purposes of this study. Alternative arguments could be made; however, a larger study allowing further exploration of these diagnostic issues is needed.

Further consideration should be given to the weight cut-offs applied for identification of Atypical AN, as well as the use of normed weight curves. In the absence of specified cut-offs in the DSM-5, the Society for Adolescent Health and Medicine clinical guidelines (30) were applied to define significant weight loss and significant low weight. Such cut-offs are necessary for the purposes of providing objective and replicable case identification in research; however, these definitions may not translate easily to clinical practice. For example, an obese adolescent who loses a large amount of weight might fall short of fulfilling the criterion of ≥10% loss of body weight due to their high premorbid weight, despite having significant symptoms requiring intervention. Similarly, while the use of normed weight curves is helpful when examining group outcomes, in clinical practice it may be more informative to consider individual growth curve trajectories. This can be helpful for identifying children and adolescents who have not necessary lost weight but have fallen off their growth curve, and for consideration of whether they need to return to their individual growth trajectory or to maintain around a median BMI for their age and gender.

During the study period, there were no explicit guidelines provided to clinicians within the service for setting weight targets for adolescents with Atypical AN. There was, however, regular communication within and across disciplines, especially between paediatric physicians and mental health clinicians, which is likely to have fostered a similar approach to weight targets. The findings suggest that this approach tended toward weight stabilization (or modest weight gain for some), a deviation from the distinct focus on weight restoration in FBT for adolescents with AN. Identifying what modifications were made to FBT to accommodate this is difficult to do retrospectively, and is likely to have varied by patient and therapist. As with AN, there is much heterogeneity in illness history (e.g., premorbid weight, amount and speed of weight loss) and trajectories of recovery. In general, our experience is that the core features of FBT remain unchanged when treating adolescents with Atypical AN (e.g., empowering parents, externalizing the illness), the obvious exception being a greater focus on normalization of eating and prevention of further weight loss rather than weight gain. It is also our experience that when stabilization of weight was not in time associated with improved cognitive symptomatology this generally led to discussion about the potential need to increase weight. As noted above, it is unknown whether this approach would improve remission rates.

Limitations aside, this study provides the first indication that FBT is a feasible treatment option for adolescents with Atypical AN. Importantly, the findings can be viewed with some confidence given the considerable experience of the FBT team and the program's consistent approach to assessment using standardized measures (35). Improving remission rates beyond those reported herein will be an important next step that will require systematic adaptations to FBT specifically designed to target the unique characteristics of this population. For example, the high prevalence of premorbid overweight and obesity may indicate a greater need for dietary guidance for families and for physical activity to be a

greater focus of therapeutic content. Other treatment approaches could also be considered such as cognitive behaviour therapy and adolescent-focused therapy (31, 36). However, these individual therapies have so far had limited success for adolescent AN, which is likely to be, in part, due to the ego-syntonic nature of the illness and subsequent ambivalence, or indeed opposition, by the individual to work towards recovery. Our observation is that this ambivalence is at least as strong in Atypical AN. Thus, active parental involvement through FBT is likely to be the most beneficial treatment option at this stage. Nonetheless, research into other treatment options is encouraged.

Conclusion

Atypical AN now represents a large proportion of presentations to child and adolescent eating disorder services (1, 3) and there is evidence that the need for prompt effective treatment for this group is just as profound as it is for those who are underweight (5). This study greatly advances our knowledge about treatment options for this population, and highlights the need for further research into the complex interactions between weight, nutrition, and psychological functioning in diagnosis and recovery from AN.

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Table 1. Criteria used in this study for eating disorder diagnoses based on EDE, P-EDE and objective height and weight measurements[a]

Diagnosis	Criteria
Full Threshold	
AN	1. ≤ 89%mBMI, 2. Intense fear of gaining weight on more than half the days in the past month; or compensatory behaviors (vomiting, laxative misuse, diuretic misuse, driven exercise, fasting) ≥1/wk for 3 mo, and 3. Felt fat on more than half the days in the past month; or at least moderate importance of shape or weight for self-evaluation in the past month; or lack of recognition of the seriousness of low weight
BN	1. 1. OBEs ≥1/wk for 3 mo, 2. Compensatory behaviors ≥1/wk for 3 mo, 3. At least moderate importance of shape or weight for self-evaluation in the past month, and 4. BMI ≥90% of median for age and gender
BED	1. Objective binge-eating episodes ≥1/wk for 3 mo, 2. Compensatory behaviors <1/wk for 3 mo, and 3. ≥90% mBMI
Other Specified Feeding or Eating Disorder	
AN, partial remission	1. Criterion 1 for AN met before presentation but currently ≥90%mBMI 2. Criterion 2 and 3 for AN met
Atypical AN	1. Loss of body weight ≥ 10%, 2. Body mass index ≥ 90% of median for age and sex, and not < 90% in the past year, 3. Intense fear of gaining weight on more than half the days in the past month; or compensatory behaviors (vomiting, laxative misuse, diuretic misuse, driven exercise, fasting) ≥1/wk for 3 mo, and 4. Felt fat on more than half the days in the past month even

Diagnosis	Criteria
	though not overweight (BMI <85th percentile); or at least moderate importance of shape or weight for self-evaluation in the past month; or lack of recognition of the seriousness of low weight
AN limited body image disturbance	1. Criterion 1 for AN met, and 2. Criterion 2 or 3 for AN met (not both)
BN limited frequency or duration	1. All criteria for BN met but OBEs and compensatory behaviors occur <1/wk for 3 mo
BED limited frequency or duration	1. All criteria for BED met but OBEs occur <1/wk for 3 mo
Purging Disorder	1. Purging (vomiting, laxative misuse, or diuretic misuse) ≥1/wk for 3 mo, 2. No OBEs, and 3. At least moderate importance of shape or weight for self-evaluation in the past month
No eating disorder diagnosis	
	1. Fear of gaining weight on less than half the days in the past month, 2. Little or no importance of shape or weight for self-evaluation in the past month, 3. No objective or subjective binge-eating episodes in the past month, and 4. No compensatory behaviors in the past month
Unspecified Feeding or Eating Disorder	
	1. All other cases

BED, binge-eating disorder; BN, bulimia nervosa; OBEs, objective binge-eating episodes; P-EDE, EDE, Parent Version. If >1 diagnosis met, first diagnosis listed is retained. Avoidant/restrictive food intake disorder was not included, as the EDE was not designed to assess all criteria for this diagnosis. The P-EDE psychometric analysis is in progress.

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Table 2. Participant characteristics (n=42)

	Mean (SD) or n (%)	Range
Age at presentation	15.4 (1.4)	12.5-18.3
Female sex	37 (88%)	
Intact family	28 (67%)	
Weight at presentation		
Kilograms	56.3 (10.0)	42.9-82.8
BMI	20.5 (2.4)	16.6-28.0
%mBMI (EBW)	102.1 (10.7)	90.3-136.5
BMI z-score	0.04 (0.61)	-0.777-1.56
BMI percentile	50.8 (21.0)	22.0-94.1
Overweight or obese[a]	2 (5%)	
Premorbid weight		
Highest %EBW	136.2 (22.8)	101.8-185.8
Overweight or obese	27 (64%)	
Loss of weight		
Kilograms	16.9 (9.3)	5.2-39.9
Percent of body weight	21.7 (7.5)	10.6-40.3
Months	13.2 (8.7)	1.54-39.6
Amenorrhea[b]	16 (43%)	
Menstrual irregularity[c]	20 (54%)	
Binge eating	5 (12%)	

Table 2 continued

	Mean (SD) or n (%)	Range
Purging	17 (41%)	
Psychiatric comorbidity	14 (33%)	
Psychotropic medication	3 (7%)	
Pre-FBT admission	21 (50%)	

[a] Overweight or obese defined as BMI ≥85th percentile (29).

[b] No menstruation in previous 3 months. Excludes males, premenarcheal females, females on hormonal contraception.

[c] Missed 1 or more periods in previous 3 months. Excludes males, premenarcheal females, females on hormonal contraception.

Table 3. Engagement in FBT (n = 42)

	Mean (SD) or n (%)	Range
Length of treatment (weeks)	20.0 (7.9)	0-34.9
Number of sessions	13.8 (5.9)	1-27
Engagement		
≤8 sessions	7 (17%)	
9-18 sessions	30 (71%)	
19-27 sessions	5 (12%)	

Table 4. Change in Symptomatology

		Baseline	Post-treatment	
	n	M (SD)	M (SD)	p
EDE Restraint	25	2.93 (1.87)	1.46 (1.66)	.004
EDE Eating Concerns	25	2.21 (1.61)	1.20 (1.60)	.006
EDE Shape Concerns	25	3.45 (2.07)	2.11 (2.16)	.001
EDE Weight Concerns	25	3.14 (1.91)	1.96 (2.24)	.011
EDE Global Score	25	2.94 (1.68)	1.68 (1.84)	.002
EDE Driven Exercise (days)	25	13.3 (11.6)	3.5 (6.9)	.001
YBC-EDS	22	15.77 (8.20)	6.50 (8.53)	.000
CYBOCS	20	4.45 (7.37)	2.30 (5.75)	.221
CDI	17	17.47 (13.73)	13.50 (12.85)	.044
RSE	17	26.8 (8.14)	26.5 (8.28)	.783
	n	n (%)	n (%)	p
Binge eating	42	5 (12%)	1 (2%)	.219
Purging	42	17 (41%)	5[c] (12%)	.002
Amenorrhea	37	16 (43%)	7[a] (19%)	.035
Menstrual irregularity	37	20 (54%)	12[b] (32%)	.021

CDI = Children's Depression Inventory; CYBOCS = Children's Yale-Brown Obsessive Compulsive Scale; EDE = Eating Disorder Examination; RSE = Rosenberg Self-esteem Scale; YBC-EDS = Yale Brown Cornell Eating Disorders Scale.

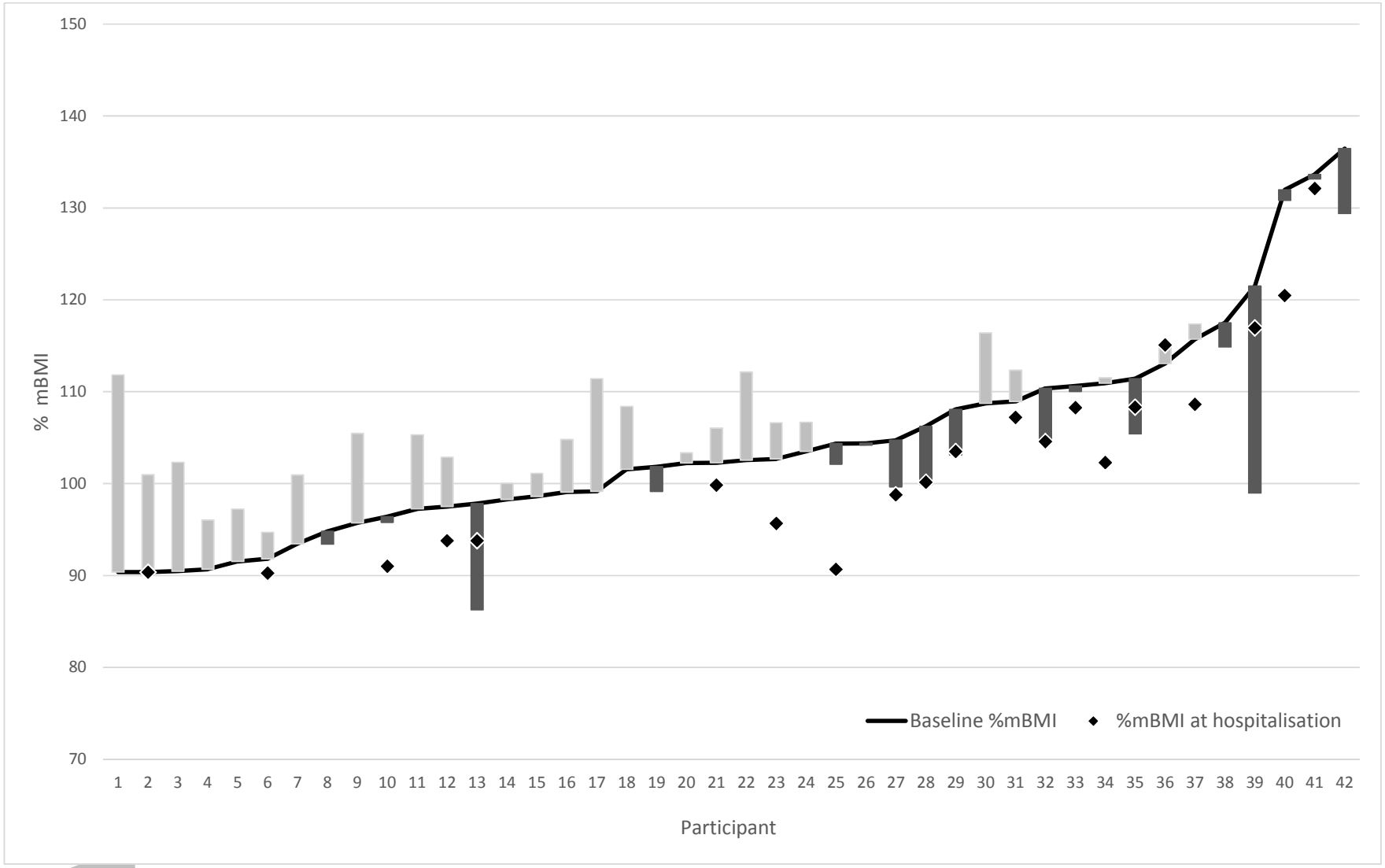
[a]3 new cases. [b]1 new case. [c]1 new case.

Table 5. Change in weight for the total sample and by hospitalisation at presentation status

	Presentation M (SD)	Baseline M (SD)	Post-treatment M (SD)	P (Baseline vs Post-treatment)
Total sample (n = 42)				
Kilograms	56.3 (10.1)	57.6 (10.5)	59.4 (10.2)	.006
BMI	20.5 (2.4)	21.0 (2.5)	21.6 (2.2)	.013
%mBMI (EBW)	102.1 (10.7)	104.5 (11.4)	106.2 (9.6)	.128
Overweight or obese	2 (5%)	4 (10%)	3 (7%)	.999
Hospitalised (n = 21)				
Kilograms	59.2 (11.2)	61.7 (11.2)	61.9 (12.1)	.806
BMI	20.8 (2.5)	21.8 (2.6)	21.7 (2.5)	.751
%mBMI (EBW)	103.4 (11.1)	108.1 (11.4)	106.5 (11.1)	.331
Overweight or obese	1 (5%)	3 (14%)	2 (10%)	.999
Not Hospitalised (n = 21)				
Kilograms	53.5 (8.0)	53.5 (8.0)	56.8 (7.3)	.001
BMI	20.3 (2.3)	20.3 (2.3)	21.5 (1.8)	<.001
%mBMI (EBW)	100.9 (10.5)	100.9 (10.5)	105.9 (8.1)	.002
Overweight or obese	1 (5%)	1 (5%)	1 (5%)	.999

Figure 1

Individual participant weight gain (dark grey bars) or loss (pale grey bars) from baseline to post-treatment. Participants are ranked along the X-axis by baseline %mBMI. Black diamonds indicate presenting %mBMI for participants admitted to hospital prior to outpatient FBT.



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