REGULAR ARTICLE

Do the Components of Manualized Family-Based Treatment for Anorexia Nervosa Predict Weight Gain?

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ABSTRACT

Objective: Family-based treatment for anorexia nervosa (FBT) has demonstrated efficacy in the treatment of adolescents with anorexia nervosa (AN) in a number of randomized control trials (RCT). The aim of the current research was to determine whether adherence to the key components of the model as outlined in the treatment manual predict weight gain or dropout.

Method: The 59 participants were under 19 years and had AN for less than 3 years. Five core treatment objectives and working alliance were measured across 20 sessions of FBT.

Results: The core objectives of parents taking control, being united, not criticizing the patient and externalizing the illness predicted greater weight gain. Sibling support did not predict weight gain. The relationship between therapeutic alliance and weight gain was positive for mothers but negative for fathers. Dropout was predicted by low control and poor maternal-therapeutic alliance.

Discussion: The results of this study lend further support for the efficacy of the FBT, demonstrating that the principles guiding clinical practice are those which lead to weight gain. The finding that parental control is the central predictor of change can also support the development of augmentations to the model. © 2012 by Wiley Periodicals, Inc.

Keywords: family-based treatment; Maudsley model; therapy

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Introduction

Anorexia Nervosa (AN) is a serious psychiatric disorder that has often proven to be difficult to treat.[1] Number of randomized controlled trials (RCTs) have demonstrated that family-based treatment (FBT), originally devised at the Institute of Psychiatry at the Maudsley Hospital, London, is an effective treatment for AN in children and adolescents with strong outcomes at both 12 months and 5 years.[2–6]

The FBT manual[7] outlines five key features of treatment, but there has been no research aimed at determining whether these features predict treatment outcome.[6] In the treatment manual,[7] parental control is described as the central feature of FBT. Parents are encouraged to take a zero tolerance approach to AN behavior, including food restriction and over-exercising. Second, the manual highlights the importance of the externalization of the illness. In particular, externalization is believed to play a pivotal role in decreasing parental criticism of the patient, a key determinant of treatment dropout.[4] Third, restructuring of the family is also seen as a critical, both in terms of the uniting of the parenting team and the strengthening of the sibling subsystem. The fourth key aspect of treatment is parental consistency, which is seen to maximize parental control. Finally, sibling support of the patient is hypothesized to help decrease distress and replace support that was previously obtained from the parents.[7]

This study aims to demonstrate whether or not these five components of treatment predict the outcome of FBT. This research aims to support the future development of the model by providing guidance to minimize modifications that might undermine efficacy and supporting the design of augmentations that play to the strengths of the approach. This study, however, remains exploratory, generating hypotheses for a more exhaustive analysis of treatment moderators and mediators.

A sixth feature, the parent therapeutic alliance, will also be included given the increasing acceptance of the role of the therapeutic relationship as a significant contributor to outcome variance across

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the psychotherapies[8] and as a predictor of overall weight gain in FBT.[9]

Method

Recruitment and Inclusion Criteria

Fifty nine participants were used in this study, each suffering from anorexia nervosa for less than 3 years. Of the 59 participants, 94.02% were female (n = 56) and 5.08% were male (n = 3). The average age was 14.57 years (SD = 1.46). During admission to the hospital, patients had a mean weight of 42.25 kg (SD = 6.15) and a mean height of 1.62 m (SD = 0.07), with a mean percentage of ideal body weight of 79.25% (SD = 6.30). In the beginning of outpatient treatment, participants had a mean weight of 46.64 kg (SD = 5.95) and height of 1.61 m (SD = 0.07), with a mean percentage of ideal body weight of 87.61% (SD = 6.02). Psychopathology at admission was measured using the EDI-3. The average percentile score for the EDI-3 Eating Disorder Risk Composite was 45.28 (SD = 10.47). In terms of family structure, 83% of families were traditional, 11% re-partnered, and 6% single parent families.

Participants were part of a larger pool of patients recruited for a RCT. The aim of this trial was to examine the effect of length of hospital admission for refeeding, before manualized outpatient FBT, on outcomes for adolescent patients with AN. The full sample comprised of 83 children and adolescents aged 12 to 18 years admitted for life threatening complications of AN, including bradycardia, hypothermia, and hypotension, with illness durations of less than 3 years. The RCT compared outcomes between individuals with AN admitted for medical stabilization, ~2–3 weeks, versus those admitted for full weight restoration to 90% of their predicted ideal body weight (IBW[10]), ~9–12 weeks, with both groups followed by 20 one-hour sessions of outpatient FBT. The current sample included 59 participants from the full sample of 83 participants who were the first 59 families to complete the outpatient treatment protocol within the current study timeframe.

Ethical Approval

This study was approved by The Children's Hospital at Westmead Ethics Committee, Westmead Hospital Ethics Committee and the University of Sydney Human Research Ethics Committee.

Measures

Core Treatment Objectives Clinician Rating Scale (CTOCRS). The Core Treatment Objectives Clinician Rating Scale (CTOCRS) is a five-item scale, designed and evaluated for this study, which asks clinicians to rate the extent to which parents are adhering to the five key components of the FBT over the past week: Control, Unity, Criticism, Externalization, and Sibling Support. One expert clinician, Dr. Paul Rhodes, observed recordings of a random selection of sessions and rated them blind to therapist ratings. This clinician had more than 8 years' experience conducting the FBT. Approximately 10% of 1000 session ratings were observed by investigating 3–4 sessions of 24 participants. The random selection of 24 participants consisted of 21 females and 3 males, with a mean age of 14.70 years (SD = 1.60). Using participant ID numbers and session numbers, participants and sessions were selected by a random number list generated on Excel.

TABLE 1. Intraclass correlation coefficients of CTOCRS

Item	Intraclass Correlation (Average Measures)	df	p
Control	.735	23	.001**
Unity	.761	23	.001**
Criticism	.825	23	.000**
Externalisation	.773	23	.000**
Sibling Support	.627	23	.011*
Total	.845	23	.000**

**Significant at $p < 0.01$.
* Significant at $p < 0.05$.

CTOCRS Interrater Reliability. Interrater reliability of the CTOCRS was assessed using average measures of intraclass correlation coefficients. The intraclass correlation coefficients indicated that each of the items of the CTOCRS and the scale as a whole, had adequate interrater reliability, with acceptable[11] correlations for all items as shown in Table 1.

Working Alliance Inventory[12]. The Working Alliance Inventory (WAI) is a 12-item self-report questionnaire for parents of patients measuring therapeutic alliance with the therapist. It is composed of three constructs: Goal, which pertains to similar goals of therapy for parents and the therapist; Task, which is the extent to which the parents and therapist are working collaboratively toward these goals; and Bond, which is the degree to which the parents feel respected and liked by the therapist and the extent to which they like and respect the therapist. Parents completed the inventory at the end of each session. The WAI and WAI-S is well validated[12,13] and reliable with Cronbach alpha for WAI-S subscales ranging from .85 to .90 and total score .92.[14]

Eating Disorders Inventory Third Edition (EDI-3)[15]. The EDI-3 is commonly used to assess psychological constructs and behaviors associated with eating disorders and supports the diagnosis of individuals with eating difficulties. It is a 91-item self-report questionnaire that provides 12 standardized subscale scores and six composite scores. Eating disorder psychopathology is measured by the Eating Disorder Risk Composite. Despite criticism that the EDI-3 is time consuming and does not provide a specific timeframe for administration it has been validated for patients as young as 13 years old[15] and was fully completed by all participants of this study.

Percentage of Ideal Body Weight. Percentage of ideal body weight was used as the main outcome measure in the current study. Raw weight and height data were transformed to percent ideal body weight (%IBW) by expressing actual weight as a percentage of the expected weight corresponding to the 50th percentile for height, age, and gender according to standardized charts[10] as a proxy for ideal weight.

Dropout. Dropout was defined as failing to complete at least 80% of therapy sessions (i.e., 16 sessions), a criteria used in prior studies.[16]

Therapists. All therapists participated in a 4-day intensive training workshop training and a 3-month period of live observation before participating in the research. In addition they were provided with fortnightly supervision. All training and supervision was conducted by a senior therapist, Andrew Wallis, who has more than 5 years experience conducting the FBT.

Procedure

Components of Treatment

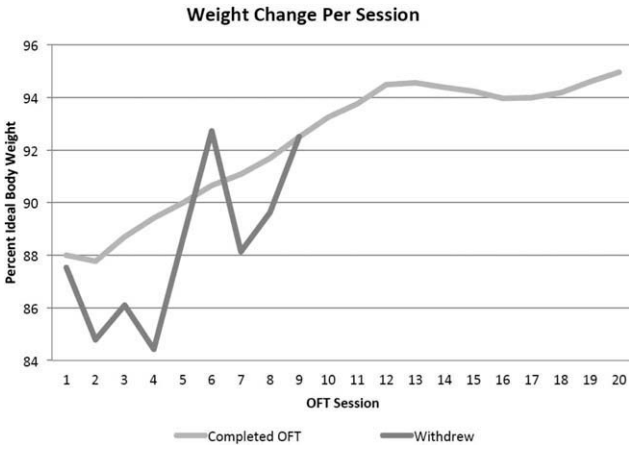
During hospital admission participants received treatment in a specialist eating disorder service for medical instability due to AN associated weight loss. Treatment included nasogastric refeeding, supported meals, individual supportive psychotherapy, behavioral ward management, and treatment of comorbid psychiatric illnesses, including the use of psychotropic medications. On discharge participants and their families attended 20 outpatient family therapy sessions conducted by therapists trained in the manualized version of FBT.[7] Weight and height were recorded at each session. After each therapy session parents completed the WAI and therapists completed the CTOCRS. Each session was videotaped and a random selection of sessions (n = 24) were observed by an expert clinician to ensure accurate and consistent administration of FBT.

Statistical Analyses

Mixed effects random regression was selected for the main analysis.[17–19] Mixed effects random regression allows longitudinal repeated measures data from therapy studies to be analyzed thoroughly and, unlike other regression models, it does not assume that each observation is independent.[17]

Logistic regression was used to examine the relationships between dropout and a number of admission variables, as well as the process variable constructs of the core treatment objectives (CTOCRS) and working alliance (WAI). For the process variables, the average score over the 20 sessions was calculated and used in these and subsequent analyses. Each variable was entered into the logistic regression independently and odds ratios (OR) were examined.

FIGURE 1. Weight change per session.



Results

Predictors of Weight Gain

Examination of average weight gain across sessions suggested a general linear increase with increasing variance across time (**Fig. 1**). Average percentage IBW increased from 87.61% at session 1 to 95.24% at session 20. The effect of treatment on weight gain was significant, $F(1, 962) = 448.23$ ($p < .01$). Of all participants, 84.7% (n = 50) had reached at least 85% of ideal body weight and 40.7% (n = 24) had reached 95% of ideal body weight by session 20. The effect of length of hospital stay on weight gain was not significant, $F(1, 59) = 3.97$ ($p = .051$), therefore for subsequent analyses the groups were conducted together. Despite this, length of hospital stay was controlled for in all further analyses.

CTOCRS scores refer to the therapists' assessment of the degree of parental achievement of targets of the main interventions of FBT. Missing CTOCRS data were minimal with 41 missing out of a total of 1015 administrations (4% missing). Higher Total CTOCRS scores significantly predicted weight gain, $F(1,901) = (34.68$ ($p < .01$). Weight gain was significantly predicted by Control, $F(1, 894) = 65.66$ ($p < .01$), Unity, $F(1, 894) = 20.65$ ($p < .01$), Criticism, $F(1, 896) = 7.41$ ($p < .01$), and Externalization, $F(1, 898) = 4.02$ ($p < .05$). The CTOCRS construct of Sibling Support did not sig-

TABLE 2. Predictors of weight gain

Construct	β	Numerator df	Denominator df	F	p
Session	.43	1	962	448.23	.000**
CTOCRS					
Control	.44	1	894	65.66	.000**
Unity	.30	1	894	20.65	.000**
Low Criticism	.19	1	896	7.41	.007**
Externalisation	.16	1	898	4.03	.045*
Sibling Support	.02	1	908	.06	.806
TOTAL	.13	1	901	34.68	.000**
Therapeutic Alliance					
Mother Therapeutic Alliance	.15	1	654	14.26	.000**
Father Therapeutic Alliance	−.18	1	494	9.62	.002**
TOTAL Therapeutic Alliance	.06	1	682	2.14	.144

** Significant at $p < .01$.
* Significant at $p < .05$.

nificantly predict weight gain $F(1, 908) = 0.06$ ($p = .806$).

Predictors of Parental Control

Control was significantly predicted by Unity, $F(1, 955) = 164.65$ ($p < .01$), Criticism, $F(1, 928) = 92.46$ ($p < .01$), Externalization, $F(1, 900) = 105$ ($p < .01$), and Sibling Support, $F(1, 642) = 21.7$ ($p < .01$).

Predictors of Dropout

The overall treatment dropout rate was 15.25%. Logistic Regression analyses were conducted for dropout as predicted by the admission variables of age, gender, percentage of ideal body weight at admission and illness severity as measured by EDI-3 Eating Disorder Risk Composite. None of these variables were significantly related to dropout (**Table 3**). Logistic regression analyses were conducted for dropout as predicted by the constructs of Control, Unity, Criticism, Externalization, Sibling Support, and working alliance subscales (**Table 3**). Control was the only core treatment variable that had a significant relationship with dropout, with higher parental control associated with lower dropout rates.

Therapeutic Alliance

The mean maternal therapeutic alliance score ($M = 15.82$, SD = 3.01) was found to be significantly greater than the mean paternal therapeutic alliance score ($M = 14.74$, SD = 3.10), $t(715) = 9.39$ ($p < .01$). Stronger mother-therapist alliance was found to predict greater weight gain, $F(1,654) = 14.26$ ($p < .01$); however, stronger father-therapist alliance was found to predict significantly less weight gain, $F(1,494) = 9.62$ ($p < .01$). Maternal and paternal therapeutic alliance scores were combined to produce a total working alliance score. Total working alliance score did not significantly predict weight gain $F(1,682) = 2.14$ ($p = .144$) (**Table 2**). Maternal therapeutic alliance also had a significant relationship with dropout, with higher alliance associated with less dropout. These findings need to be interpreted with some reservation, given an 83.5% response rate for mothers and a 73% response rate for fathers. Although mixed effects random regression will have taken some of this bias into account it is likely that missing data were not random in nature, but rather based on paternal attendance and therefore needs to be treated with caution.

Discussion

The current study is the first to measure the five key components of FBT as described in the treatment manual.[7] Higher parental control of eating disordered behavior, greater parental unity, lower criticism of the patient by the parents and greater externalization of the eating disorder were all significantly related to greater treatment outcome as rated by weight gain. Of all the core components of the FBT, parental control over AN behavior was found to be the strongest predictor of outcome. This finding matches a qualitative study,[20] where parents believed that taking control of recovery was one of the most important aspects of FBT. The issue of control is one that is prominent in AN, as sufferers become attached to the sense of omnipotent control over their bodies.[21] Current findings suggest that removing the opportunity for this control from patients may be an essential part of treatment.

The only core component of FBT that did not significantly predict weight gain was the siblings' support of the patient. Higher levels of sibling support, however, were found to significantly predict increased parental control. It is possible that sibling support helps parents to relinquish a degree of concern for their child's emotional well-being, empowering them to take a firmer stance concerning anorexic behavior. For this reason, it cannot be recommended that siblings be excused from family therapy sessions. These results regarding siblings, however, need to be considered with some reservations. On the CTOCRS sibling support is described as 'The sibling/s or sibling substitute's supports the patient when he/she becomes distressed regarding parental control'. Although each of the families in the study relied on at least one person to provide such support, single child families relied on school

TABLE 3. Predictors of dropout-results of logistic regression analyses

	Dropped Out ($n = 9$)	Completed Treatment ($n = 50$)	β	OR	p
Gender			19.55	.00	.10
Male	0(0%)	3(6%)			
Female	9(100%)	47(94%)			
	Mean(SD)	Mean(SD)			
Age	15.35(1.29)	14.42(1.52)	.42	1.52	.10
EDI-3 Eating Disorder Risk Composite (%)	52.38(34.25)	44.04(30.67)	.01	1.01	.48
%IBW at session 1	86.56(4.33)	87.79(6.46)	−.03	.97	.58
Control	2.64(.96)	3.25(.72)	−1.02	.36	.032*
Unity	3.06(.67)	3.43(.65)	−.90	.41	.13
Criticism	3.61(.78)	3.42(.71)	.39	1.48	.47
Externalisation	3.48(1.04)	3.70(.59)	−.48	.62	.37
Sibling Support	2.90(1.11)	3.21(.93)	−.33	.72	.37
Total CTOCRS	15.65(3.35)	16.95(2.70)	−.17	.85	.21
Mother ($n = 48$)	13.32(3.26)	16.00(2.58)	−.33	.72	.02*
Father ($n = 44$)	14.66(2.35)	14.72(3.01)	−.01	.99	.95

* Significant at $p < .05$

or family friends or relatives, many of whom did not attend sessions. The varying degrees of intensity of this support across families may have influenced any effect that sibling support could have on weight gain.

Therapeutic alliance for both mothers and fathers was found to significantly impact on weight gain. For mother-therapist alliance, this relationship was positive, with stronger therapeutic alliance predicting significantly greater weight gain and less dropout. Interestingly, the relationship between father-therapist alliance and weight gain was negative, indicating that stronger father-therapist alliance predicted less weight gain. One possible hypothesis for this finding is that fathers might have been reacting against pressure from the therapist to fulfil the refeeding role traditionally perceived as a mother's responsibility. This does not necessarily correspond, however, with the finding that parental unity was significantly related to weight gain. These findings concerning therapeutic alliance need to be considered cautiously due to rates of missing data detailed in the results.

The overall dropout rate in the current study was 15.25%, which is similar to other studies.[2–6] Higher levels of parental control significantly predicted less dropout. This finding provides further support for the importance parental control in FBT. Maternal therapeutic alliance also significantly predicted dropout, with stronger mother therapeutic alliance significantly predicting lower likelihood of dropping out of treatment. This provides further support for the critical role of the therapeutic relationship between mother and therapist, an issue that receives little emphasis in the treatment manual.

Further research is required to test alternative predictors of outcome to those outlined in the manual. A host of other potential contributors to recovery are possible, including changes in attachment relationships resulting from the restructuring of the family or changes in the patient's ability to regulate emotion due to the provision of emotional support. Kazdin and Nock[22] and Kraemer et al.[23] also argue that a control condition is important. Future research could therefore include general family therapy as a control condition, comparing the levels of parental control, parental unity, criticism, and externalization using the CTOCRS throughout treatment. The current study could also be strengthened in a number of ways. CTOCRS and WAI ratings, for example, could have been conducted by an independent observer. The WAI could also have been scored by family members. The Eating Disorders Examination[24] could also have been used as an alternative to the EDI-3, given its status as a gold standard for outcome.

Conclusion

This study is the first to evaluate the central tenets of FBT. Although further research is needed, results suggest that the principles guiding the model are those which lead to weight gain. In particular, the finding that parental control is the central predictor of change is important when considering potential augmentations to FBT. The model still does not work for a significant minority of patients, including those with more chronic conditions.[2] Interventions which serve to support parents in developing their effectiveness in the management of anorexic behavior may be particularly promising, including those that foster solidarity between parents.[25] Parent-to-parent consultations, for example, between

veteran parents and those commencing treatment[26] have been found to be of some benefit, with one session provided early in treatment leading to a small but significant increase in the rate of weight restoration by the end of treatment.[27,26] More regular mentoring programs or intensive parent-groups may serve to further support parents in their management of anorexic behavior. Multiple family therapy[28,29] also has potential because of the focus on parental solidarity. Further research is required to assess the role of these types of interventions in the harnessing of parental control.

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