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Desired weight and treatment outcome among adolescents in a novel family-based partial hospitalization program

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ABSTRACT

The purpose of the current study was to investigate desired weight percentage and weight difference percentage and their association with treatment outcome in a novel family-based partial hospitalization program. Twenty-six adolescents with anorexia nervosa or subthreshold anorexia nervosa between the ages of 12 and 19 completed the Eating Disorder Examination (EDE) at intake and upon completion from a partial hospitalization program in which parents played a large role in the recovery process, consistent with family-based treatment principles. Lower desired weight percentage at baseline was associated with higher scores on the restraint subscale of the EDE at end of treatment. Higher weight difference percentage (greater desire to lose weight) at baseline was associated with higher scores on all EDE subscales and global score at end of treatment. Neither desired weight percentage nor weight difference percentage at baseline were associated with treatment dropout or percent expected body weight at end of treatment. In a family-based program, participants' desired weight may be related to eating disorder thoughts (for example, shape or weight concerns) but not to behavioral outcomes such as weight gain or treatment dropout, which may be more directly under the influence of the parents.

1. Introduction

Body dissatisfaction has been found to predict the onset of eating disorders (Rohde et al., 2015; Stice et al., 2017) and, while relatively common among nonclinical samples (Neumark-Sztainer et al., 2002), has been found to be higher among individuals with eating disorders than those without (Coker & Abraham, 2014). One way to assess body dissatisfaction is to examine the discrepancy between one's actual and desired body weight, which has been suggested to be a more specific measure of dissatisfaction than discrepancies between one's actual and desired body shape (Boyd et al., 2017). Among a nonclinical sample of adolescents, high levels of weight discrepancies were found to be associated with ED symptomatology (Zarychta et al., 2014). Boyd et al. (2017) examined patients' "desired weight percentage" (desired weight as a percentage of expected body weight (EBW), adjusting for age and sex) and "weight difference percentage" (desired weight in relation to current weight) and found that both were associated with weight concern, shape concern, and restraint. They also found that those with anorexia nervosa (AN) reported wanting to gain 5.28% of their body weight, while those with bulimia nervosa (BN) wanted to lose 13.60% (Boyd et al., 2017). However, those with AN still desired to be in an unhealthy weight range, reporting a desired weight percentage of 84.2. Change over time and associations with treatment outcome were not assessed in this study.

Factors associated with treatment outcome are important to identify in order to further our understanding of therapeutic change (Kraemer et al., 2002), particularly in the context of evidence-based interventions. Family-based treatment (FBT) (Lock and Le Grange, 2012) is often considered the first-line treatment for adolescents with eating disorders. In the first phase of FBT for AN, parents are put in charge of the weight restoration process until the eating disorder symptoms begin to recede, at which point control over eating is gradually handed back to the adolescent (phase 2). Thus, parents temporarily make all eating-related decisions for their child and monitor all meals and snacks. Phase 3 involves a review of adolescent developmental issues and ensuring that the adolescent is back on track developmentally.

In the context of FBT, early response to treatment has been shown to be a predictor of remission (Doyle et al., 2010; Le Grange et al., 2014; Madden et al., 2015). Studies have also examined moderators and

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mediators of treatment, finding that eating-related obsessionality, family status, and eating disorder specific psychopathology are moderators of outcome in FBT for AN (Le Grange et al., 2012; Lock et al., 2005), and eating disorder specific psychopathology is a moderator of outcome in FBT for BN (Le Grange et al., 2008). Desired weight has not been examined in these studies.

Given the overvaluation of weight and shape that is a hallmark of both AN and BN, (APA, 2013), individuals with these disorders could be expected to attempt to lessen the discrepancy between their actual and desired weight by engaging in eating disordered behaviors. This raises the question of how treatment might impact their weight discrepancy – particularly in the case of individuals with AN, treatment presumably would increase the discrepancy between their actual and desired weight as treatment should involve weight restoration (NICE, 2017) – and how desired weight in turn may impact treatment. It is possible that those with greater actual-desired weight discrepancies are more resistant to treatment if treatment involves weight restoration, or perhaps individuals' weight goals change during treatment.

In a recent study, Boyd et al. (2018) assessed change over time and association with treatment outcome. At admission, patients reported a desire to be 81% of a healthy BMI. After a year of treatment, they reported wanting to be 86% of a healthy BMI. Those who wanted to be a lower percentage of a healthy BMI (lower desired weight percentage) or who wanted to lose a larger percentage of weight (higher weight difference percentage) reported worse eating disorder psychopathology over the course of treatment. This study was the first to examine desired weight and treatment outcome.

The purpose of the current study is to expand on the findings of Boyd et al. (2017, 2018) by investigating desired weight percentage (desired weight as a percentage of EBW) and weight difference percentage (desired weight in relation to current weight) and their association with treatment outcome for adolescents in a partial hospitalization program (PHP). Boyd et al. (2018) also examined patients receiving a higher level of care (inpatient or day hospital treatment), with patients' ages ranging from 16 to 62. The focus of the current study will be specifically on adolescents in a family-based PHP. Given the nature of FBT and its emphasis on parent-led recovery, it is possible that desired weight in the current study will be related to treatment outcome in a different way than it would be for adults (Boyd et al., 2018). In addition, it will expand on Boyd et al. (2017) by examining desired weight at end of treatment. It was hypothesized that a lower desired weight percentage and higher weight difference percentage would be associated with worse eating disorder psychopathology and lower percent EBW at end of treatment.

2. Method

2.1. Participants and procedure

Participants were 26 adolescents between the ages of 12 and 19 seeking treatment for an eating disorder between August 2012 and November 2015. As part of their intake assessment, participants completed a number of interview-based and self-report measures, and the full battery was repeated upon discharge from treatment. Diagnoses were made by the treatment team according to DSM-IV-TR criteria and based on answers to the Eating Disorders Examination (EDE; Cooper and Fairburn, 1987) and a psychiatric interview. The study was approved by the Institutional Review Board of the University of Michigan. Adolescent patients signed assent for their data to be used for research purposes, and patients over the age of 18 signed informed consent. Participants were chosen for the current study if they gave consent for their data to be used for research purposes, and if they fully completed the interview-based measure at baseline and discharge. Fifty-eight additional patients would have been eligible for the study but either did not complete the interview-based measure at both baseline and discharge, or were missing data required for analyses, such as weight at baseline or desired weight at baseline or discharge. This was often due to refusal on the part of the patient to participate in assessments or answer particular questions that were part of the assessment.

2.2. Treatment

Patients participated in a family-based PHP for eating disorders (Hoste, 2015). Programming was Monday through Friday for six hours per day, during which patients participated in breakfast, a snack, lunch, and group therapy. The program was based on family-based treatment (FBT) (Lock and Le Grange, 2013) principles in several ways: parents chose all meals and snacks for their child while in the program, and were required to attend breakfast daily with their child. After breakfast, parents attended a "debriefing" session; these sessions are similar to phase 1 sessions in manualized FBT, but in a group format. The focus of these sessions is to support parents to find ways to interrupt eating disordered behavior and increase caloric intake. In addition, all families participated in the first two sessions of manualized FBT prior to joining the PHP, and parents were required to attend a weekly skills group designed to help them be more effective in the weight restoration process. The treatment team consisted of a pediatrician, a psychiatrist, a psychologist, social workers, dietitians, a learning specialist, and patient care associates. Patients and families had regular meetings with the psychiatrist, pediatrician, and psychologist. Upon completion of treatment in the PHP, patients had the option of stepping down to an intensive outpatient program, which met three mornings a week for three hours per day.

Treatment noncompletion was defined as discontinuation of participation in the PHP prior to the recommendations of the treatment team. There were not clear cutoffs for treatment completion, but factors that were considered prior to step-down from the PHP included weight gain and/or stabilization of binge eating and purging, rate of weight gain and amount left to gain, participation in programming, cooperation with parental involvement in treatment, and parental confidence in continuing the weight restoration process without the additional structure of the PHP.

2.3. Measures

Eating Disorder Examination (EDE) (Cooper and Fairburn, 1987). The EDE, which was completed at intake and end-of-treatment, is a semi-structured interview designed to assess the behavioral and cognitive psychopathology of eating disorders. It consists of four subscales: restraint, eating concern, shape concern, and weight concern, and a total score. The EDE has been shown to have good psychometric properties (Berg et al., 2012) and is considered the "gold standard" of eating disorder assessment. Higher scores on the EDE indicate worse pathology. Participants' height and weight were measured as part of the EDE by a trained assessor. Desired weight was assessed by the following question: "On average, over the past month what weight have you wanted to be?".

2.4. Statistical analysis

As in Boyd et al. (2017), desired weight percentage (desired weight as a percentage of EBW) was calculated by dividing patients' desired weight by their EBW and multiplying by 100. EBW was calculated for patients based on height, age, and gender, using CDC growth charts. Weight difference percentage (desired weight in relation to current weight) was calculated by subtracting patients' desired weight from their current weight, dividing by their current weight and multiplying by 100. Thus, positive values reflect a desire to lose weight and negative values reflect a desire to gain weight. Both desired weight percentage and weight difference percentage were calculated at baseline.

Paired-sample *t*-tests were used to compare differences in mean change in EDE Global Score, mean change in desired weight, and mean

change in percent EBW between baseline and discharge. Linear regressions were used to examine associations that age, weight at intake, days in PHP, and eating disorder subtype may have with restraint, eating concern, shape concern, weight concern, and global score at end of treatment. All analyses were performed using SAS Inc., v. 9.4, Cary, N.C.

3. Results

Participants had a diagnosis of AN ($n = 12$; 46.2%) or EDNOS (patients who met criteria for AN except for the amenorrhea criterion, or who were over 85% EBW despite significant weight loss) ($n = 14$; 53.8%). Six patients (23.1%) were classified as belonging to the binge/purge subtype based on the presence of one or more episodes of binge eating or purging in the past month. The average age was 15.5 ($SD = 2.2$), the majority were female (88.5%), and all were Caucasian. Most participants came from intact families (73.1%). Participants' mean % EBW was 88.1 ($SD = 12.6$). The average duration of illness was 24.6 months ($SD = 23.9$). The mean number of binges in the last month was 1.2 ($SD = 4.6$) and the mean number of compensatory vomiting episodes in the last month was 1.6 ($SD = 4.9$). The average length of stay in the PHP was 27.6 days ($SD = 10.9$) and 96.2% were considered treatment completers. However, this does not reflect treatment adherence in the program as a whole, as those who did not complete certain assessment questions may have been more likely to drop out of treatment prematurely.

EDE Global Score changed from 2.3 ($SD = 1.6$) at baseline to 2.0 ($SD = 1.42$) at end-of-treatment. Paired sample t-tests indicated that this was not a significant change, $p = .12$. Desired weight changed from 102.4 lbs. ($SD = 22.6$) at baseline to 106.8 lbs. ($SD = 21.3$) at end of treatment in the PHP. This was not statistically significant, $p = .12$. Percent EBW changed from 88.1 ($SD = 12.6$) at baseline to 101.5 ($SD = 14.8$) at end of treatment, $p < .001$.

The mean desired weight percentage (desired weight as a percentage of EBW) at baseline was 84.3 ($SD = 13.6$), indicating that patients on average wanted to weigh 84.3% of their EBW. Lower desired weight percentage at baseline was not associated with treatment dropout, $F(1, 24) = 0.108$, $p = .75$. After controlling for age, weight at intake, days in PHP, and eating disorder subtype, lower desired weight percentage at baseline was associated with higher scores on the EDE at end of treatment for restraint, and there was a trend toward significance for global score, $p = .06$ (see Table 1). Desired weight percentage was not associated with change in any of these scores. Desired weight percentage at baseline was also not associated with %EBW at end of treatment, $p = .27$.

The mean weight difference percentage (desired weight in relation to current weight) was 2.6 ($SD = 20.2$), indicating a desire to lose 2.6% of their current body weight. Weight difference percentage at baseline also was not associated with treatment dropout, $F(1, 24) = 1.735$, $p = .20$. After controlling for age, weight at intake, days in PHP, and eating disorder subtype, higher weight difference percentage at baseline was associated with higher scores on all EDE subscales and global score at end of treatment (see Table 2). Weight difference percentage was not associated with change in any of these scores. Weight difference percentage at baseline was also not associated with %EBW at end of treatment, $p = .79$. Desired weight percentage and weight difference percentage at baseline were highly correlated, $r = -0.76$, $p < .001$.

Table 1
Desired weight percentage and its association with EDE scores at end of treatment.

Variable	β	R^2	t	p
Restraint	−0.53	0.30	−2.37	0.029
Eating concern	−0.32	0.26	−1.42	0.174
Shape concern	−0.31	0.23	−1.34	0.196
Weight concern	−0.34	0.35	−1.60	0.128
Global score	−0.42	0.35	−1.97	0.064

Note. EDE = Eating Disorder Examination.

Table 2
Weight difference percentage and its association with EDE scores at end of treatment.

Variable	β	R^2	t	p
Restraint	0.75	0.42	3.20	0.005
Eating concern	0.58	0.37	2.39	0.028
Shape concern	0.60	0.36	2.41	0.027
Weight concern	0.60	0.47	2.65	0.016
Global score	0.70	0.49	3.16	0.005

Note. EDE = Eating Disorder Examination.

4. Discussion

The purpose of the current study was to investigate desired weight percentage (desired weight as a percentage of EBW) and weight difference percentage (desired weight in relation to current weight) at baseline and their association with treatment outcome in a family-based PHP. Consistent with hypotheses, lower desired weight percentage and higher weight difference percentage were associated with worse eating disorder psychopathology at end of treatment. Having a lower desired weight percentage was associated with higher scores on restraint and a trend toward higher global EDE scores, and a desire to lose weight (higher weight difference percentage) was associated with higher scores on all EDE subscales and global EDE score.

Contrary to hypotheses, desired weight percentage (desired weight as a percentage of EBW) and weight difference percentage (desired weight in relation to current weight) were not associated with lower % EBW at end of treatment. This finding could be due to the nature of the treatment setting. In the PHP, and consistent with FBT principles, parents are put in charge of the weight restoration process and are given responsibility for all food-related decisions while their child is in the PHP. Given the ego-syntonic nature of AN, the weight goals of the patient are not taken into consideration when establishing a target weight range. Thus, regardless of the wishes of the patient, parents are encouraged to supportively restore their child back to health. This may explain why a lower desired weight percentage was not associated with lower %EBW at end of treatment or treatment dropout, which parents have control over, but it was associated with worse eating disorder psychopathology as measured by the EDE, which parents may have less control over, particularly the eating disordered thoughts as opposed to behavioral symptoms.

In contrast to Boyd et al. (2017), patients in the current study did not report wanting to gain weight, but wanted to lose 2.6% of their current body weight. It is possible that patients entering treatment at the PHP level were more impaired than the outpatient sample in Boyd et al.'s study and less motivated to improve. The current sample also had a longer duration of illness, suggesting the possibility that the longer a person suffers from an eating disorder, the more entrenched it becomes and the less willing they are to recover.

Also in contrast to Boyd et al. (2017), desired weight percentage and weight difference percentage were highly negatively correlated, suggesting that wanting to be at a low weight and wanting a weight that is different than what one currently has are related in the current sample. This may be due to the diagnostic homogeneity in the current study, whereas Boyd et al. had a mixed sample of AN and BN.

Desired weight did go up slightly at the end of treatment, although this change was not statistically significant. This small change may be because of the relatively short length of stay in the PHP (approximately five weeks), as compared to a full course of outpatient treatment, which is typically 6–12 months for FBT. It is possible that the desired weight

may have continued to go up as patients progressed through the next phases of treatment. Future studies may aim to more closely examine changes in desired body weight over time, how it changes, and how it may relate to treatment outcome. It is possible that desired weight increases as cognitive changes occur in the patient as a result of better nutrition and healthier weights. Accurso et al. (2014) found that weight gain predicted improved eating disorder psychopathology, with scores at the end of treatment falling in the non-clinical range. It is possible that with longer treatment, desired weight may have increased further. Similarly, changes in EDE Global Score were not significant. Despite the significant increase in %EBW, the short duration of treatment may limit the extent to which changes in eating disordered thinking may be expected to occur, particularly given that weight gain has been shown to precede changes in symptoms such as preoccupation with shape and weight (Clausen, 2004). It is further possible that the mechanisms by which desired weight may change over time differ by diagnosis. Unfortunately the current study had a homogenous diagnostic sample and this could not be investigated further.

It may be useful for clinicians to assess desired weight at the onset of treatment, as it is related to scores on the EDE at the end of treatment, which have been shown to be related to long-term outcome for adolescents and adults (Lock et al., 2013). In addition, knowledge of desired weight at baseline may enable more personalized intervention programs by encouraging those with low desired weight percentages to consider the impact this will have on their short- and long-term recovery and making it a specific target of treatment. Researchers may further investigate the relationship between desired weight and recovery.

Limitations of the study include the small sample size, number of patients who did not fully complete assessments at baseline and/or discharge, wholly Caucasian sample, and lack of a clinical comparison group. Boyd et al. (2017) found differences in desired weight goals between participants with AN and BN. Investigating how this is related to treatment outcome for both groups is an important area for future research. Future studies may also investigate desired weight percentage, weight difference percentage, and treatment outcome in treatment programs that are not family-based, in an effort to determine whether these constructs have a different impact on treatment outcome in forms of treatment that have more of an individual focus, such as cognitive-behavioral therapy. In addition, the lack of follow-up data is a limitation. Higher desired body weight may predict better treatment outcome for patients with AN who primarily restrict their eating, but it also predicts crossover from AN binge/purge type to BN (Monteleone et al., 2011). Longer-term studies may identify patients who experience diagnostic crossover. Furthermore, findings from the current study are in the context of a family-based PHP and may not be generalizable to PHPs that do not require a similar level of parental involvement, or to outpatient settings.

Conflict of interest

Dr. Rienecke receives consulting fees from the Training Institute for Child and Adolescent Eating Disorders, LLC. Ms. Ebeling has no conflicts of interest to report.

Supplementary materials

Supplementary material associated with this article can be found, in the online version, at doi:10.1016/j.psychres.2019.01.028.

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