



The Disconnect between Treatment Outcome Data and Reimbursement for the Treatment of Anorexia Nervosa

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Abstract

A major problem plaguing the discussion of insurance reimbursement for the treatment of anorexia nervosa is the apparent gap between research on variables associated with outcome and the formulas used for reimbursement. Outside of the mental health world, insurance coverage is driven by advanced analytics and actuarial data. However, in calculating insurance reimbursement for the treatment of anorexia nervosa, actuarial data associated with short-term and long-term outcomes are not utilized. Insurers typically focus on length of stay and daily rates in decision-making regarding preferred providers. However, it is possible to calculate the costs and effectiveness of treatment much more precisely by comparing treatment providers against benchmarks such as rate of weight gain and discharge body weight published in the literature. Providers should be encouraged to publish admission and discharge BMIs along with daily reimbursement rates to allow consumers and insurers to evaluate the cost effectiveness of treatment.

psychological and physical symptoms argues against defining eating disorders as exclusively “psychiatric” or “medical” since treatment inevitably affects psychiatric as well as medical reimbursement risk pools.

A major conundrum plaguing discussions with insurers regarding reimbursement for the treatment of eating disorders is the apparent gap between research on variables associated with outcomes and the formulas used for reimbursement. Outside of the mental health world, insurance coverage is driven by advanced analytics and actuarial data. Data are meticulously gathered from internal and external sources to predict exposure and establish rates. For example, in modeling longevity risks, mortality tables are augmented by data on gender, income, smoking, exercise, diet, genetics, pre-existing conditions and medical advances. With regard to insurance reimbursement for eating disorder treatment (and probably most other mental health conditions), the usual rules do not apply. While the problems in predicting outcomes with many mental health conditions may be inherently nebulous, that is not the case with eating disorders, particularly AN.

Introduction

Eating disorders are common, relatively chronic and potentially life-threatening conditions primarily affecting young women. Anorexia Nervosa (AN) is estimated to be the third most common chronic medical illness in girls aged 15-19 years [1] and bulimia nervosa is even more common [2,3]. Whereas there is some evidence that the incidence of bulimia nervosa has decreased significantly over the past three decades, the overall incidence of AN has been remarkably stable [4]. The mortality rates for AN are twice as high as seen in any other psychiatric disorder and more than 12 fold the number of deaths expected from all causes among women 15-24 years of age [5]; mortality rates for bulimia nervosa are also significant [6]. While most of the deaths attributed to AN are related to starvation or medical complications of the disorder, it is alarming that 20% of deaths are due to suicide [3]. Medical complications are typical during the acute phase of an eating disorder [7,8] and persist among those not successfully treated [9], leading to a wide range of physical and emotional disorders into early adulthood [10]. There is still considerable debate concerning the criteria for recovery [11,12] with quality of life remaining poor for many [13] and the costs of treatment being substantial [14]. The complex interplay between

In our experience, attempting to introduce meaningful outcome data and analytics into negotiations with insurers regarding reimbursement rates for AN has been met with dumbfounding resistance. Contract discussions with the insurers typically focus on two variables: 1) length of stay and 2) daily rates. While these parameters are undoubtedly important, all things being equal, the fact is that the most relevant variables across treatment providers are not equal. The most meaningful and accessible variables for reimbursement discussions are specific variables that can be expected to change over the course of treatment and which are meaningfully related to long-term outcome. It is impractical to evaluate long-term treatment effectiveness for most providers since most do not have the resources to collect long-term follow-up data. Moreover, most have not been in operation long enough to provide a meaningful long-term end point. In real-life, non-university-based treatment settings where most of the effectiveness data could be gathered, treatment providers are fortunate if they are able to collect reimbursement for treatment actually provided. It is unheard of for insurers to offer compensation for collecting long-term follow-up data. Nevertheless, in these settings it is possible to assess specific pre-post variables

Table 1: Demographic and Clinical Features of 535 Anorexia Nervosa First Admissions to PHP or Residential Treatment.

	Total Anorexia Nervosa Sample (n = 535)		Adult Partial Hospitalization (n = 291)		Adolescent Residential (n = 244)		t-Test *	
	Mean	SD	Mean	SD	Mean	SD	t	p <
Age (years)	21.8	9.4	27.2	9.7	15.2	1.9	19.1	0.001
Duration Ill (yrs.)	6.4	8.1	10.1	9.5	2.1	1.9	12.9	0.001
Days of Service (DOS)	52.1	39.0	50.9	44.2	53.5	31.8	0.7	ns
Admission Weight (lbs.)	95.7	14.9	98.9	14.3	91.9	14.7	5.6	0.001
Discharge Weight (lbs.)	114.3	16.2	116.8	15.4	111.3	16.8	3.9	0.001
Total Pounds Gained	18.6	11.0	17.9	12.0	19.5	9.6	1.6	ns
Pounds per Week	2.2	1.3	2.1	1.5	2.4	1.1	2.5	0.02
Admission BMI	16.2	1.7	16.5	1.7	16.0	1.6	3.7	0.001
Discharge BMI	19.4	1.9	19.5	1.9	19.4	1.9	0.9	ns

*Comparison between adult and adolescent groups using two-tailed t-test.

that have repeatedly been shown to predict both short-term and long-term outcomes. Two of the most well-established variables for AN are: 1) achieving an appropriate discharge body weight and 2) patient retention rates. Other variables also predict outcome such as duration of illness, bingeing and vomiting frequency, patient age, and personality characteristics; however, unlike discharge weight and patient retention, these patient variables are either not modifiable (e.g., age and duration of illness) or are individual difference variables (e.g., high bingeing and vomiting frequency and psychological variables), not treatment variables.

The aim of the current study is to present data on admission and discharge weight and BMI, total weight gain, rate of weight gain for an AN sample treated in a specialized eating disorder treatment facility as a benchmark for treatment efficacy delivered by a highly skilled staff using a well-established treatment model. Results compare adults receiving 5-day-a-week Partial Hospitalization Program (PHP) and adolescents in a 24-hour-a-day, 7-day-a-week Residential Program (RES). Psychometric data at admission and discharge are also presented to determine if body weight outcome is paralleled by psychological change.

Methods

Subjects

A retrospective chart review was conducted on 1,110 consecutive first admissions to an Adult Partial Hospitalization Program (PHP) and an Adolescent Residential Program (RES) at a private treatment facility specializing in the treatment of EDs between 2002 and 2014. The adult (18 years-of-age and older) PHP combines 35 hours per week (11:30 am-6:30 pm, 5 days-a-week, 7 hours-a-day) of programmatic treatment with the option of independent dormitory-style living outside of program hours at no additional cost. The adolescent (9-17 years of age) RES program is 24 hours-a-day, 7 days a week initially; however, patients are often stepped down to fewer days later in treatment based on clinical need and parent availability for monitoring. Both programs follow a well-established model based on evidence-based treatment principles [15,16]. The nutritional rehabilitation program is meal-based and does not involve nasogastric or parenteral refeeding methods. Oral supplements are used occasionally to assist in the early stages of the re-nutrition process.

Only patients meeting a diagnosis of AN (n = 535) were analyzed for this report. Diagnoses were made by the admitting clinical staff according to the DSM-5 *Diagnostic and Statistical Manual of Mental Disorders, Fifth Edition* [17] and reviewed by research staff to ensure that the clinical diagnoses were consistent with the diagnostic criteria. Out of 535 AN patients, 314 were the restricting type and 221 were the binge-eating/purging type. There were 506 females (280 PHP and 226 RES) and 29 males (11 PHP and 18 RES). The majority of patients were admitted on at least one psychotropic medication [18]. The retrospective chart review was approved by the Clinic Institutional Review Board and it was determined to comply with the Health Insurance Portability and Accountability Act guidelines. Patient

names and identifiers were removed prior to conducting all analyses. Patients were informed that clinical information collected could be used to evaluate the effectiveness of their treatment program, and informed consents for this purpose were obtained upon admission.

Measures

All patients completed a detailed online assessment prior to admission, which included demographic and symptom data, height, current weight, highest weight ever, lowest adult weight, sex, age, frequency of bingeing and vomiting, laxative and diuretic use to control weight and treatment history. All demographic and clinical data were verified by a clinician at the time of admission. Height and body weight were measured on the first day of admission and then daily until discharge. Self-report measures including the EAT-26 [19] and EDI-3 [20] were administered at admission and again at discharge. Statistical analyses were conducted using the IBM SPSS 20 statistical software. Comparisons for statistical significance were made for clinical and psychometric data using paired-*t*-tests for pre-post measures, and planned two-sided *t*-tests for group comparisons.

Results

Table 1 presents data comparing the 535 AN patients in the PHP and the RES programs on demographic and clinical features including age, duration of illness, days of service (DOS), start weight, discharge weight, total pounds gained, admission BMI, discharge BMI, and rate of weight gain expressed as pounds per week. The average admission BMI was 16.5 for the adults and 16.0 for the adolescents (Table 1) with most patients qualifying for inpatient treatment according to the American Psychiatric Association Practice Guidelines for Eating Disorders [21] based only on weight. The mean admission BMI for the combined groups was 16.2; the 10th, 20th and 30th admission BMI percentiles were 13.9, 14.8 and 15.4 respectively. Admission and discharge weights were higher for the adults compared to adolescents ($p < 0.001$). As expected, there were statistically significant differences between the PHP and RES patients in age and duration of illness ($p < 0.001$). There were no statistically significant differences between PHP and RES groups in total pounds gained, post-treatment BMI and days of service (DOS). The results presented in table 1 indicate that the average rate of weight gain for the PHP and RES groups is 2.1 and 2.4 pounds per week (0.95 kg-1.1 kg) or 0.30-0.34 lbs. per day (0.14-0.16 kg) respectively. The average discharge BMI was 19.5 for PHP patients and 19.4 for the RES patients; 75% of patients had a discharge BMI of greater than 18.3.

Table 2 presents pre- and post-treatment paired t-test results for the EAT-26 and EDI-3 data for patients who had complete data on both occasions (n = 356) indicating that there are significant psychological improvements on all scales ($p < .001$) paralleling the positive weight gain and rate of weight gain during treatment. Of interest, there was no significant correlation between pre-post EDI-3 change scores and amount of weight gained or rate of weight gain suggesting that these variables were not associated with adverse outcome on standardized psychological measures.

Table 2: Paired t-Test Comparison of Pre and Post Treatment Psychometric Variable Means for Anorexia Nervosa First Admissions (n = 356).

	Pre-Treatment		Post-Treatment		t-Test*	P <
	Mean	SD	Mean	SD		
Drive for Thinness	17.8	8.3	8.9	7.4	19.9	0.001
Bulimia	7.1	7.9	2.0	3.3	13.2	0.001
Body Dissatisfaction	23.0	10.9	19.0	11.3	6.5	0.001
Low Self-Esteem	12.1	6.3	8.1	5.8	11.4	0.001
Personal Alienation	12.9	6.7	8.2	5.9	13.1	0.001
Interpersonal Insecurity	11.9	6.1	8.5	5.9	10.9	0.001
Interpersonal Alienation	9.7	5.5	7.4	5.0	8.4	0.001
Interceptive Deficits	15.8	9.1	9.8	7.7	12.3	0.001
Emotional Dysregulation	7.4	5.8	4.8	4.7	9.1	0.001
Perfectionism	12.2	6.1	10.0	5.6	9.3	0.001
Asceticism	10.4	6.4	7.0	5.7	10.1	0.001
Maturity Fears	11.3	6.8	8.4	5.8	9.9	0.001
EAT-26	39.3	17.9	13.3	13.1	26.5	0.001

*Paired t-Test comparison of pre and post treatment scores.

Discussion

Low discharge weight is a treatment variable that has consistently been shown to be negatively associated with outcome in studies of adolescent and adult patients [22-31]. Steinhausen and colleagues [32] present convincing data indicating the “strong effect of insufficient weight gain during first admission and lower BMI at the first discharge emphasizes the importance of adequate interventions” (p. 29). In a multisite study, Steinhausen *et al.* [33] state that “Recovery from AN in the short and the long-term cannot be achieved without interventions aiming at restoration of normal weight because persistence of underweight has far-reaching consequences for health and wellbeing of the patients” (p. 24). Not only is a higher discharge weight predictive of outcome, rate of weight gain is also a positive predictor. Lund *et al.* [34] found that a higher rate of weight gain during treatment was the only predictor of positive short-term clinical outcome.

The results from the current study of 535 AN patients indicate an average rate of weight gain of 2.1 pounds (0.95 kg.) per week in a 5-day-a-week adult PHP and a somewhat higher average of 2.4 pounds (1.09 kg.) per week in an adolescent RES program can be expected when delivered by an experienced staff and using the most advanced treatment technology. The average weight gain was 19.9 pounds (8.3 kg.) for the PHP adults and 19.5 pounds (8.7 kg.) for the adolescents in the RES program and the average discharge BMIs for both groups were 19.5 and 19.4 respectively. The average admission BMI was 16.2 and the discharge BMI was 19.5. The duration of treatment for the adult PHP patients was just over 10 weeks and was a similar duration for adolescents who typically began the RES program for 7 days a week but transitioned to fewer days if clinical and practical circumstances permitted.

It is important to caution that there are a myriad of complex psychological and social variables beyond weight gain that must be considered in optimal treatment; however, weight gain is indisputably tied to outcome. The current study also demonstrated that the positive findings for weight gain and discharge BMIs were paralleled by improvement on standardized psychological measures pertinent to eating disorders.

The rate of weight gain and discharge BMI in the current study compare very favorably with published findings from inpatient treatment programs. In a recent review of feeding methods used in the treatment of AN, Hart *et al.* [35] identified 26 papers describing a total of 37 samples, the majority reporting the amount of weight gain during inpatient treatment, discharge weights and DOS. Nasogastric tube feeding or parenteral nutrition was used in 13 samples. There were 24 samples that reported both the amount of weight gained during treatment and DOS. For these samples, the average amount

of weight gain was 5.7 kg over an average of 53.9 DOS for an average weekly weight gain of 1.6 lbs. (0.7 kg.); however, the rate of weight gain varied widely across treatment programs. The four slowest rates averaged 0.69 lbs. (0.32 kg.) per week compared to the four highest at 4.0 lbs. (1.8 kg) per week. However, in the 24 samples that reported discharge BMI, the average was a BMI of 17.2 with only three programs achieving a discharge BMI above 19.0. Goddard *et al.* [36] reviewed 14 hospital treatment programs in the UK (12 adult and 2 adolescent) and reported that the average duration of treatment for adults (n = 150) was 26.4 weeks and average weekly weight gain was 0.4 kg. (0.2 lbs.); the small number of adolescents received an average of 29.0 weeks of treatment with weekly weight gain of 0.5 kg. (0.2 lbs.). The adults (n = 137) and adolescents (n = 7) for whom discharge data were available had discharge BMIs of 17.3 and 18.5 respectively. The majority of adults remained in the AN BMI range at discharge (58%) and only 22% of patients were discharged at a BMI of greater than 19.0. In a recent report of adolescent inpatient treatment of AN, Weiss and Straub [37] reported the average weight gain for 17.3 days of treatment was 2.0 kg with 71% of patients experiencing initial weight loss after admission. These studies indicate that despite the imperatives for weight gain in treatment, the published rate of weight gain and discharge weights in many inpatient treatment settings is modest.

Nevertheless, there are published reports that a greater rate of refeeding can be accomplished without medical complications. Garber *et al.* (2015) reviewed 27 refeeding programs for AN and found that the rate of weight gain varied from 0.62 kg./wk. (0.3 lbs.) to 1.98 kg./wk. (4.4 lbs.). Among the studies reviewed, Redgrave *et al.* [38] reported the highest average weekly rate of weight gain of 2 kg./wk. during inpatient treatment for an average of 26.3 days; the rate of weight gain was 1.36 kg./wk. (3.0 lbs.) for the subsequent step-down into a partial hospitalization program. Dalle Grava *et al.* [39] reported a post treatment BMI of 19.2 in a controlled inpatient study with 90% of patients completing treatment. Other recent studies have shown promise particularly with adolescents; superior outcomes have been attributed to specialist services with greater expertise in treating AN [40,41].

Previous cautions about the dangers of more aggressive weight gain in treatment appear to be largely unfounded [42]. Although most of the research on refeeding in AN is based on inpatient treatment, using meals only, nasogastric feeding, parenteral refeeding or some combination of refeeding methods, the financial burden of these inpatient programs must be considerable. Innovative day treatment or partial hospitalization programs have been described; however, the weight gain statistics are generally less impressive than inpatient treatment. Lammers *et al.* [43] describe their own day treatment program as well as others in the literature; however, weight gain was not reported. Goldstein *et al.* [44] reported on a day treatment program for 28 adolescent AN patients who began treatment at an average BMI of 16.5 but were discharged at an average BMI of 17.1, remaining in the AN range. The best results are from several studies [38,45] that achieve a very good rate of weight gain during partial hospitalization; however, in both studies, this followed inpatient treatment. In the current study, patients were admitted directly into the PHP and achieved weight gain and discharge BMI results that were comparable to a younger group admitted to our Residential Program.

Despite the association between higher discharge weight and positive outcome, there is considerable pressure from insurers in the United States to reduce treatment duration in order to reduce costs. On the surface, this seems reasonable given the fact that AN historically has been particularly costly to treat because the duration of inpatient treatment required for complete weight restoration can be between two to three months and relapses are common during the first year after discharge. Moreover, the costs of inpatient treatment have increased dramatically in the past several decades, placing insurers under pressure to limit exposure. However, missing from the analysis in negotiating daily rates and treatment duration with

Table 3: Cost Comparison of Partial Hospitalization versus and Residential/Typical Inpatient Hospitalization for Anorexia Nervosa.

	Partial Hospitalization (5-days/wk.)	Residential or Inpatient (7-days/wk.)	Inpatient Hospitalization (7-days/wk.)	Inpatient Hospitalization (7-days/wk.)	Inpatient Hospitalization (7-days/wk.)
Daily Rate	\$600	\$800	\$1,200	\$1,500	\$2,000
Days per month	20	30	30	30	30
Cost per month	\$12,000	\$24,000	\$36,000	\$45,000	\$60,000
Cost for 10 wks.	\$30,000	\$60,000	\$90,000	\$112,500	\$150,000
Cost of 20lb. gain @ 1 lb./wk	\$60,000	\$120,000	\$180,000	\$225,000	\$300,000
Cost per lb.	\$3,000	\$6,000	\$9,000	\$11,259	\$15,000
Cost of 20lb. gain @ 2 lbs./wk	\$30,000	\$60,000	\$90,000	\$112,500	\$150,000
Cost per lb.	\$1,500	\$3,000	\$4,500	\$5,625	\$7,500

insurers is the remarkable variation in discharge weights and rates of weight gain achieved by different treatment facilities. These variables have a direct effect on the overall cost of treatment. Simply put, a day of service (DOS) in which the patient gains an average of 0.1 kg is twice as expensive as a DOS in which the patient gains an average of 0.2 kg. Moreover, although treatment duration of 5 weeks may be less costly than 10 weeks, if it leads to a low discharge weight, we know from the outcome literature that the patient is doomed to failure [32,33]. In making program comparisons, it is important to recognize that nutritional rehabilitation that progresses too slowly or that sets target weights too low generally reflects ineffective treatment. On the other hand, the speed of weight gain has limits since refeeding too quickly can lead to biological dangers, such as re-feeding syndrome, and psychological risks if patients feel overwhelmed [46]. Moreover, weight gain is not the only variable to consider, and rate of weight gain can be expected to vary across the heterogeneous patient population. Nevertheless, average rate of weight gain and average discharge weights can provide meaningful benchmarks in evaluating the cost-effectiveness of different treatment facilities. In this regard, it is reasonable to ask what is the rate of weight gain and discharge weight that is reasonable to expect in the treatment of AN.

Table 3 shows the hypothetical difference in cost for treating AN at different daily rates for 5-day-a-week Partial Hospitalization versus typical residential and inpatient treatment. As can be seen, the total costs of treatment increase with the number of days of treatment as well as with higher daily rates. Although daily rates influence the overall costs of treatment, the number of days of treatment per month is important in considering the overall cost for 10 weeks of treatment. Moreover, using the benchmark of 20 pounds of weight gain, the average weight gain of 1 pound-per-week (and cost-per-pound) is dramatically higher than 2 pounds per week. The bottom line is that the cost-effectiveness of treatment for AN can only be compared across treatment settings that quote specific daily rates and lengths of service within the context of *rates of weight gain*, and *discharge weight* metrics. Slower rates of weight gain cost insurance companies much more over the course of treatment and lead to discharge weights inconsistent with positive short-term and long-term outcomes.

The current study has been limited to examining body weight as a measure of treatment effectiveness; however, it is important to acknowledge that there are other pertinent treatment variables that are relevant to a comprehensive assessment of treatment effectiveness. For example, symptom control related to binge eating, vomiting, impulsivity, anxiety and depression have been found to be related to outcome in AN [11,12,30,47]. It is obvious that treatment is ineffective if patients do not engage in the treatment process; therefore, patient retention rate is another important indicator of potential treatment effectiveness. There are several reasons people may leave treatment in the first week after admission, including the inability to obtain ongoing insurance coverage, not being ready for the challenges of needed treatment, or requiring a higher level of care. However, it has been our experience that these premature discharges can be reduced to between 5% and 8% in an adult Partial Hospitalization Program and less than 3% in an Adolescent Residential Program. Therefore, when discussing daily rates with insurers, it is important for retention rates to be part of the discussion since failure to retain patients

presumably leads to more emergency medical treatment and higher levels of care down the road.

In sum, it can be concluded that there is tremendous variability on weight-related outcome variables across treatment programs. It is important to emphasize that treatment programs should be evaluated by insurers on a range of criteria such as delivery of treatment founded on evidence-base principles, qualifications of staff, staff-to-patient ratios, and health and safety standards. However, failure to evaluate individual treatment programs on their ability to deliver satisfactory (i.e. cost-effective) rates of weight gain, and discharge BMIs is a disservice to patients, high-quality providers and insurance companies alike.

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