Prediction of Outcome in Bulimia Nervosa by Early Change in Treatment

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Objective: The authors' goal was to identify predictors of treatment response in bulimia nervosa and, in particular, to attempt to replicate and extend the observation that early change predicts outcome.

Method: Predictors of response at the end of treatment and 8-month follow-up were sought from a group of 220 women treated with either cognitive behavior therapy or interpersonal psychotherapy.

Results: Early change in frequency of purging was the best predictor of response at the end of treatment and at 8-month follow-up.

Conclusions: Early change in treatment is a robust and potent predictor of immediate and longer-term outcome in bulimia nervosa.

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Knowledge of predictors of treatment response can inform clinical management and enhance understanding of the ways treatments work. Attempts to identify predictors of outcome in bulimia nervosa have yielded inconsistent findings. This probably reflects the use of small and heterogeneous samples, differing definitions and measures of outcome, and exposure to different treatments.

Agras et al. (1) reported that early change in treatment was a good predictor of posttreatment response to cognitive behavior therapy for bulimia nervosa. This finding came from a multisite study that had an operational and widely employed definition of outcome and the leading evidence-based treatment. In the present paper we report on an attempt to replicate this finding and extend it to another treatment and to participants' clinical state at 8-month follow-up.

Method

The data are from a two-site comparison of two treatments for bulimia nervosa—cognitive behavior therapy and interpersonal

TABLE 1. Predictors of Response for 220 Women With Bulimia Nervosa Treated With Cognitive Behavior Therapy or Interpersonal Psychotherapy at Two Clinical Centers

Predictor Variable	End of Treatment					8-Month Follow-Up				
	Responder (N=39)		Nonresponder (N=181)		Effect Size (r)	Responder (N=50)		Nonresponder (N=170)		Effect Size (r)
	N	%	N	%		N	%	N	%	
Baseline variables										
History of anorexia nervosa	8	21	45	25	−0.04	12	24	41	24	0.00
History of obesity	14	36	48	27	0.08	18	36	44	26	0.09
Current borderline personality disorder	4	10	32	18	−0.08	10	20	26	15	0.05
Current major depression	8	21	39	22	−0.01	9	18	38	22	−0.05
	Mean	SD	Mean	SD		Mean	SD	Mean	SD	
Body mass index	24.64	5.99	22.60	4.35	0.17*	24.03	5.28	22.64	4.53	0.14*
Purging										
Duration (years)	10.92	7.60	9.62	6.59	0.07	10.36	7.35	9.71	6.62	0.05
Frequency (/28 days)	30.59	19.10	53.51	44.54	0.23**	41.80	39.32	51.62	42.6	0.10
Eating Disorder Examination scores										
Restraint subscale	3.27	1.38	3.53	1.20	0.08	3.51	1.37	3.47	1.20	0.01
Weight/shape concern subscale	3.42	1.30	3.58	1.32	0.04	3.59	1.34	3.54	1.31	0.01
Rosenberg self-esteem scale score	25.33	6.27	26.48	5.75	0.08	26.52	5.39	26.21	5.99	0.01
Social adjustment scale score	2.20	0.47	2.34	0.51	0.07	2.33	0.61	2.31	0.48	0.00
Global psychiatric symptom index	0.98	0.58	1.25	0.66	0.15*	1.18	0.74	1.21	0.62	0.04
Early response variable: purging frequency at 4 weeks										
Episodes per week	2.18	2.74	9.44	11.32	0.43**	3.49	4.81	9.54	11.56	0.32**
Percentage change from baseline	0.59	0.48	−0.26	0.49	0.25**	−0.63	0.35	−0.23	0.51	0.34**

*p<0.05.　　**p<0.001.

psychotherapy. Details of the design and methods are given in the main report (2). Women with the purging type of bulimia nervosa (N=220) were randomly assigned to the two treatments, which involved 19 sessions over a period of 20 weeks. Patients were assessed before and after treatment and at 8-month follow-up. The main measure of outcome was the Eating Disorder Examination (3). Potential baseline predictors of outcome were duration of eating disorder (purging); histories of anorexia nervosa and obesity; level of eating disorder features, general psychiatric symptoms, and self-esteem; current major depression and borderline personality disorder; and quality of social adjustment. Frequency of purging (episodes per week, assessed by using a computerized questionnaire) after 4 weeks of treatment and change in frequency of purging were evaluated as additional predictor variables because early change in purging was the best predictor of outcome in the previous study (1).

To identify predictors of outcome at the end of treatment and at 8-month follow-up, we compared patients who had or had not responded to the treatment at each time point using two analytic methods. First, we used univariate analysis of variance models for continuous variables and chi-square analyses for dichotomous variables (α=0.05 for these models). The Pearson correlation coefficient was used as the effect size index because of its similar interpretation across interval, ordinal, and nominal variables (r= 0.10–0.20 indicated small effect, r=020–0.40 indicated medium effect, and r>0.40 indicated large effect). Second, we performed classification tree analysis (4) because it is a nonparametric procedure that does not assume linear effects (α=0.01 for these exploratory models).

Results

Participants who reported no episodes of binge eating or purging (over the previous 28 days) at the end of treatment were classed as responders, as in the previous study, and they were compared with the remaining subjects (Table 1). Responders were significantly more likely to have received

cognitive behavior therapy for bulimia nervosa and to have been treated at Stanford. They had a higher baseline body mass index, lower frequency of purging, and lower level of general psychiatric symptoms. They also had a lower frequency of purging after 4 weeks of treatment and a greater reduction in purging over these 4 weeks.

The classification tree analysis predicting posttreatment response, which included all predictors in Table 1, generated a tree with two splits and three terminal nodes. Frequency of purging at 4 weeks emerged as the first significant predictor (r=−0.39, N=201, p<0.001). Participants who reported no purging during the fourth week of treatment were more likely to be responders (risk=0.55) than those who were still purging (risk=0.12). Percentage change in purging frequency during the first 4 weeks of treatment emerged as the next predictor (r=−0.27, N=170, p<0.001), but only among those who continued to purge at week 4. In this subgroup, those who showed a reduction of at least 49% in purging frequency were more likely to be responders (risk=0.25) than those who did not (risk=0.06). No other significant predictors emerged.

Equivalent comparisons of responders and nonresponders 8 months after the end of treatment revealed that the former had a significantly higher baseline body mass index, a lower purging frequency after 4 weeks of treatment, and a greater reduction in purging over these 4 weeks. The classification tree analysis predicting 8-month outcome generated a tree with three splits and four terminal nodes.

Percentage reduction in purging frequency over the first 4 weeks of treatment emerged as the first significant predictor (r=−0.38, N=201, p<0.001). Participants who showed

a reduction of at least 51% were more likely to be responders (risk=0.45) than those who showed a smaller decrease (risk=0.12).

Frequency of purging at the fourth week of treatment emerged as the next predictor (r=–0.25, N=128, p=0.005), but only among those with the smaller decrease in purging frequency. In this subgroup, those who purged less than 3.5 times per week were more likely to be responders (risk= 0.26) than those who purged more often (risk=0.07).

Percentage reduction in purging during the first 4 weeks of treatment emerged for a second time as a predictor (r= –0.31, N=97, p=0.002), but only among those who showed less than a 51% reduction in purging and were purging more than 3.5 times per week at week 4 of treatment. In this subgroup, those who showed a greater than 7% reduction were more likely to be responders (risk=0.16) than those who showed a smaller decrease (risk=0.00). No other significant predictors emerged.

Discussion

These findings replicate and extend the previous observation that early behavior change in treatment predicts outcome in bulimia nervosa (1). Both studies found that, from among a wide range of potential predictors, early change in frequency of purging (used as a reliably measured index of behavior change) is the best predictor of end-of-treatment response. In the present study we found that this phenomenon was not restricted to patients treated with cognitive behavior therapy for bulimia nervosa; it was also evident in those who received interpersonal psychotherapy (half of the patients had received interpersonal psychotherapy for bulimia nervosa). Most strikingly, we also found that early change predicted patients' state 8 months after treatment, which is more than 12 months after the behavior change occurred, reinforcing the clinical importance of the observation. Both studies were large in size (414 patients in total), and both involved more than one treatment center, making it likely that the finding is robust.

From these two studies it is not possible to determine whether it is the type of patient who makes significant early behavior changes who has a good prognosis, whether it is the behavior change itself that predicts outcome, or whether it is both. Nevertheless, the finding suggests that the first few weeks in treatment are especially important and that particular effort should be made to maximize early behavior change. It also suggests that patients who have not made significant changes early on need additional help if they are to achieve a good outcome. One strategy for addressing this problem is to broaden the focus of treatment at this point to address the specific processes that are judged to be obstructing change (5). Finally, it should be noted that early change predicts outcome not just in bulimia nervosa but also in other psychiatric disorders, including depression, alcohol abuse, and panic disorder (6).

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