

Relapse Predictors of Patients With Bulimia Nervosa Who Achieved Abstinence Through Cognitive Behavioral Therapy

Katherine A. Halmi, MD; W. Stewart Agras, MD; James Mitchell, MD; G. Terence Wilson, PhD; Scott Crow, MD; Susan W. Bryson, MA; Helena Kraemer, PhD

Background: Little information exists on relapse in patients with bulimia nervosa who responded with complete abstinence from binge eating and purging to cognitive behavioral therapy. Identification of relapse predictors may be useful to design effective early intervention strategies for relapse of susceptible patients with bulimia nervosa.

Methods: This multisite study examined relapse in 48 patients with bulimia nervosa who had responded to cognitive behavioral therapy with complete abstinence from binge eating and purging. Structured interviews and questionnaires were used to assess patients before and after treatment and at 4 months after treatment.

Results: Four months after treatment, 44% of the patients had relapsed. Those who relapsed had a higher level of preoccupation and ritualization of eating and less motivation for change, and had maintained abstinence for a shorter time during the treatment period.

Conclusions: The predictors of relapse found in this study can be readily determined by clinicians. The effectiveness of early additional treatment interventions needs to be determined with well-designed studies of large samples.

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THE DETERMINANTS of relapse in patients with bulimia nervosa who achieved complete abstinence from binge eating and purging with cognitive behavioral therapy (CBT) would be useful to ascertain for several reasons. The identification of variables associated with relapse may engender modifications leading to more effective treatment. If relapse predictors are known, it may be possible to design effective post-CBT intervention strategies for susceptible patients or to modify CBT to prevent relapse.

There are few studies of relapse in patients with bulimia nervosa who have responded with complete abstinence from binge eating and purging to the most effective treatment for bulimia nervosa, CBT.¹ The response to treatment for bulimia nervosa has had a variety of definitions. The most unambiguous definition is complete cessation of binge eating and purging. In a study comparing CBT, interpersonal therapy, and behavior therapy, Fairburn et al² found at the end of treatment that 44% of the patients had complete abstinence

from bingeing and vomiting. At a 1-year follow-up, 27% of these participants had relapsed or had a resumption of bingeing and vomiting; however, the original treatment received by these patients was not identified. In that study, 2 pretreatment variables, level of self-esteem and degree of attitudinal disturbance (the sum of overvalued ideas of the importance of shape and weight as measured by the Eating Disorders Examination [EDE]), had a significant predictive relationship with outcome. The relationship between the pretreatment degree of attitudinal disturbance and outcome was complex, with patients who had an intermediate level of attitudinal disturbance doing the least well, and those with the most severe disturbance doing the best. Attitudinal disturbance at the end of treatment remained a predictor of outcome. The posttreatment relationship between residual level of attitudinal disturbance and outcome was more in accordance with clinical expectations. Specifically, relapse occurred in 9% of those with little, 29% of those with moderate, and 75% of those with severe attitudinal disturbance.

From the Department of Psychiatry, Weill Medical College of Cornell University, White Plains, NY (Dr Halmi); Department of Psychiatry, Stanford University School of Medicine, Palo Alto, Calif (Drs Agras and Kraemer and Ms Bryson); Department of Neurosciences and the Neuropsychiatric Research Institute, University of North Dakota School of Medicine and Health Services, Fargo (Dr Mitchell); Department of Psychology, Rutgers University, Piscataway, NJ (Dr Wilson); and Department of Psychiatry, University of Minnesota School of Medicine, Minneapolis (Dr Crow).

The present study examines relapse in 57 patients with bulimia nervosa who responded to CBT with complete abstinence from binge eating and vomiting. This was a multisite study that used the Fairburn manual described in Wilson et al.¹ Thus, it was possible to determine predictors of relapse in patients with bulimia nervosa who had received the state-of-the-art treatment and who responded with complete abstinence.

METHODS

This study sample included 57 patients with bulimia nervosa who had achieved abstinence (no binges or purges) as assessed by the EDE after a 16-week trial of CBT (see Agras et al.³ for details of the original recruitment and study). Of those 57, 48 were available for assessment 17 weeks later. There were no significant baseline differences between those who returned for the follow-up measure and those who were unavailable for follow-up. The study was conducted at 3 sites: Weill Medical College of Cornell University, White Plains, NY; the University of Minnesota, Minneapolis; and Rutgers University, Piscataway, NY. The data center was at Stanford University, Stanford, Calif. All patients had signed an internal review board-approved consent form.

In the original study, 194 women who met *DSM-III-R* criteria for bulimia nervosa were treated with CBT. Doctorate-level psychologists experienced in the treatment of eating disorders delivered the CBT. A training and monitoring process was instituted to standardize the therapeutic procedures within and across sites. All therapy sessions were audited for the therapist's adherence to the treatment manual. A randomly selected sample of audiotapes were reviewed and feedback was provided to the therapist on his or her accuracy. On-site supervision of therapy continued at weekly intervals. Details of the recruiting and screening procedure, inclusion and exclusion criteria, the CBT therapy, and immediate outcome were reported by Agras et al.³

ASSESSMENTS

Both structured interviews and questionnaires were used to assess patients before and after treatment and at the 4-month posttreatment follow-up. Weight and height were measured before and after treatment to calculate body mass index. The EDE⁴ was used before and after treatment to assess specific eating disorder pathology, including frequency of binge eating and purging, ie, self-induced vomiting and/or laxative use. The Yale-Brown-Cornell Eating Disorder Scale (YBC-EDS) was used before and after treatment to measure the severity of eating disorder symptomatology.⁵ This scale is based on the structure and format of the Yale-Brown Obsessive-Compulsive Scale, which assesses type and severity of obsessive-compulsive symptomatology.⁶ The YBC-EDS is a semistructured, clinician-administered interview. Four scores are obtained from the YBC-EDS: preoccupations, rituals, total (the sum of preoccupations and rituals scores), and motivation to change (the sum of the resistance, insight, and desire for change scores for both preoccupations and rituals). Current and past psychopathology were assessed by means of the Structured Clinical Inventory for *DSM-III-R* I and II before treatment.

Other self-report instrument assessments before and after treatment included the Three-Factor Eating Questionnaire,⁷ the impulsivity subscale of the Multidimensional Personality Questionnaire,⁸ and the Rosenberg Self-esteem Questionnaire.⁹ Continued abstinence was assessed at 2-week intervals throughout treatment by self-report based on 1-week recalls. To obtain these recalls, the participant used a com-

puter, which displayed the dates and relevant days of the week and asked for the number of binges and purges for each day.

STATISTICAL ANALYSES

Because the sample for this study was not large, the number of variables used in the analysis needed to be limited. Hence, we selected variables that either had been shown to be predictors of relapse in CBT for bulimia nervosa or that were of theoretical interest. In addition, posttreatment values of variables were given precedence over pretreatment values.

The following variables were used in the analyses: demographic data (participant's age, duration of illness, and body mass index); general psychopathology (presence of a personality disorder, obsessive-compulsive personality and borderline personality, lifetime or current major depression and obsessive-compulsive disorder, Multidimensional Personality Questionnaire impulsivity scale, and Rosenberg Self-esteem Scale); eating disorder measures (YBC-EDS [total score and motivation to change] and Three-Factor Eating Questionnaire restraint scale); and progress during therapy (number of weeks that the participant had been abstinent at the end of treatment ascertained by means of the 1-week recall). Patients who relapsed and patients who maintained abstinence were compared by means of 2-way analyses of variance with site and relapse status as independent measures. For continuous measures, effect sizes were calculated by means of Cohen *d* (the standardized mean differences between the relapse and maintenance groups). The natural logarithm of the odds ratio was used if the measure was binary. Signal detection methodology was then used to determine optimal algorithms to identify at the end of treatment which subjects were most likely to relapse. All of the above variables were used in the analysis. For a full discussion of the merits of signal detection analysis, see Agras et al.³

RESULTS

This sample was primarily white (42 [88%] of the 48 patients followed up) and well educated, with only 4 (8%) not having attended college. Slightly more than half of the sample (26 [54%]) met criteria for a lifetime history of major depression, while 7 (15%) had a current diagnosis of major depression. One third of the sample (16 [33%]) was diagnosed as having a personality disorder, and 7 (15%) had a history of anorexia nervosa. Before CBT, the sample reported binge eating an average of 26 times per month and purged an average of 41 times per month. There were no significant relationships between these variables and relapse status.

Table 1 shows the univariate relationships for the predictor variables, comparing subjects who relapsed and subjects who maintained their abstinence. There was one center difference for age ($F_{2,42}=5.12, P=.01$), with Cornell having older subjects (Cornell, 34.4 years; Minnesota, 27.4 years; Rutgers, 25.2 years). By week 34 (17 weeks after the end of CBT), 21 subjects had resumed bingeing and/or purging, with a mean level of 8.3 binges per month (range, 0-64) and 12.1 purges per month (range, 0-64). Most of these participants met criteria for eating disorder not otherwise specified (17 patients [81%]); the remainder met full criteria for bulimia nervosa. Subjects who had resumed bulimic behaviors had a mean duration of 5.5 years less than those who maintained abstinence ($F_{1,42}=5.09, P=.03$). Subjects who relapsed also had higher scores on

Table 1. Univariate Predictors of Relapse*

	Relapsed at 34 wk (n = 21)	Maintained at 34 wk (n = 27)	Effect Size
Age, y†	27.3 (8.4)	31.1 (9.7)	-0.41
Duration of illness, y‡	9.2 (6.6)	14.7 (9.3)	-0.64
Personality disorder, No. (%)	7 (33)	9 (33)	0
EDE purge frequency before CBT§	26	25	-0.12
EDE shape concerns score after CBT	2.4 (1.4)	1.5 (1.4)	0.64
EDE weight concerns score after CBT	1.7 (1.4)	1.4 (1.4)	0.21
BMI after CBT	24.5 (4.1)	26.7 (7.0)	-0.37
Total YBC-EDS scores after CBT¶	7.8 (5.5)	2.8 (3.4)	0.98
YBC-EDS motivation to score change after CBT¶	4.7 (4.2)	2.0 (2.8)	0.73
TFEQ restraint score after CBT#	13.6 (5.0)	9.1 (4.2)	0.88
MPQ impulse control score after CBT	15.7 (5.2)	16.3 (5.7)	-0.13
Beck Depression Inventory score after CBT	5.4 (6.0)	2.7 (3.5)	0.55
No. of weeks abstinent at end of treatment‡	10.8 (4.3)	13.4 (3.7)	-0.62

*Data are given as mean (SD) unless otherwise indicated. EDE indicates Eating Disorder Examination; CBT, cognitive behavioral therapy; BMI, body mass index; YBC-EDS, Yale-Brown-Cornell Eating Disorder Scale; TFEQ, Three-Factor Eating Questionnaire; and MPQ, Multidimensional Personality Questionnaire.

†Center difference, $P < .01$.

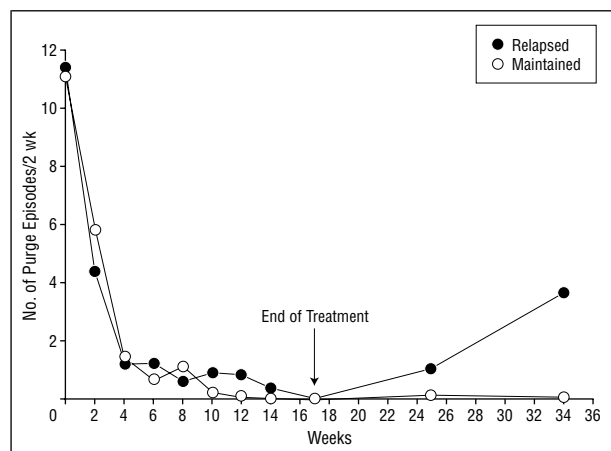
‡Relapse difference, $P < .05$.

§Medians reported; analysis performed with square root transformation.

||Calculated as weight in kilograms divided by height in meters squared.

¶Relapse difference, $P < .001$.

#Relapse difference, $P < .01$.



Number of purge episodes per week at 2-week intervals during treatment (weeks 0-16) and follow-up (weeks 18-34) for those who relapsed and those who did not.

the post-CBT YBC-EDS ($F_{1,41} = 13.6, P < .001$), indicating a higher level of preoccupation and ritualization of eating; higher scores on the motivation change subscale of the YBC-EDS, indicating less motivation for change ($F_{1,41} = 8.4, P = .006$); and higher post-CBT restraint scores ($F_{1,40} = 11.0, P = .002$). Those who had relapsed had been abstinent for a shorter amount of time before the end of CBT ($F_{1,42} = 6.3, P = .02$). The **Figure** shows that the group who maintained abstinence had a consistent pattern of abstinence by 10 to 12 weeks of treatment. When the univariate tests were adjusted for multiple comparisons, the total YBC-EDS score and the Three-Factor Eating Questionnaire restraint scale remained significant. Comorbid symptoms such as depression or obsessionality were not related to outcome (**Table 2**). There were no significant differences in the presence or absence of comorbid symptomatology between those who relapsed and those who maintained abstinence.

Table 2. Comorbid Symptomatology in Relapsed and Abstinent Groups

	Relapse at 34 wk, No. (%), (n = 21)	Maintained at 34 wk, No. (%), (n = 27)	Effect Size
Borderline personality disorder	5 (24)	3 (11)	-0.96
Obsessive-compulsive personality disorder	1 (5)	3 (11)	0.92
Past depression	11 (52)	15 (56)	0.13
Current depression	3 (14)	4 (15)	0.04
Past obsessive-compulsive disorder	3 (14)	1 (4)	-1.47
Current obsessive-compulsive disorder	3 (14)	0 (0)	NA*

*Not applicable.

The results of the signal detection analysis showed that the best predictor of relapse was a total YBC-EDS posttreatment score greater than or equal to 7 ($\chi^2 = 15.07, P < .001$), indicating a greater degree of preoccupation and rituals regarding eating. The second step of the analysis indicated that subjects who scored less than 7 on the YBC-EDS and had not been consistently abstinent from purging by self-report between weeks 10 and 14 of the study were also more likely to relapse ($\chi^2 = 6.2, P = .05$). It should be noted that all subjects were free of purges between weeks 14 and 17 because at the end of treatment we selected a sample that was abstinent as assessed by the EDE, which uses a 4-week time frame. Using these 2 tests in combination (selecting subjects who scored ≥ 7 on the YBC-EDS at posttreatment or those who had not achieved continued abstinence since week 10 of treatment) would correctly classify 18 of 21 subjects who would relapse by 34 weeks but would incorrectly identify an additional 5

of 27 subjects who would not need supplementary treatment. The sensitivity of this test was 0.86 and the specificity was 0.81. The predictive value of a positive test was 0.78 and the predictive value of a negative test was 0.88.

Comparison of posttreatment assessments in the 9 patients who were not available for follow-up with the 48 patients who were available showed significant differences on only 2 measures: the Beck Depression Inventory and the Rosenberg Self-esteem Questionnaire. Scores on the Beck Depression Inventory (mean [SD]) were 1.4 (0.38) in the 9 unavailable patients and 3.9 (4.9) in the 48 patients who were followed up ($T_{51}=2.0, P=.05$). Rosenberg scale scores were 15.4 (4.8) in the 9 unavailable patients and 19.8 (4.7) in the 48 patients who were followed up ($T_{51}=2.3, P=.02$). Those unavailable had "healthier" scores than those available, but the small sample size indicates that these results may be misleading.

COMMENT

This study is unique in that it assessed predictors of relapse in a substantial sample of patients with bulimia nervosa who were completely abstinent at the end of a standardized, manualized, and effective CBT. There are no other studies, to our knowledge, that allow for a direct comparison with our findings. The 44% relapse rate in those who had become abstinent by the end of treatment is not encouraging, since this occurred within the 4 months after treatment. However, this relapse rate is not dramatically different from the 34% found in an 8- and 12-month follow-up of 32 patients with bulimia nervosa who were abstinent at the end of a similar CBT treatment.¹⁰

In a 2-year follow-up of 48 patients with bulimia nervosa treated in a day-hospital eating disorder program, a relapse rate of 31% was observed, with most relapses occurring within the first 4 months after treatment. All patients had achieved "symptom control" during the treatment program.¹¹ Pretreatment variables such as presence of a personality disorder, low body mass index, low impulse control, and low self-esteem were not associated with relapse in this day-hospital study.

In the Fairburn et al study,² which assessed relapse at 1 year, the 2 pretreatment variables that predicted outcome, level of self-esteem, and degree of attitudinal disturbance as measured by the EDE, were not significant predictors of relapse in our study. These differences underscore the need for replication in further studies.

The significantly greater duration of illness in those maintaining abstinence after 4 months following the completion of treatment was a surprising result. It is possible that these patients were more motivated to follow through with their cognitive and behavioral exercises after the end of treatment than those who relapsed, and they also had a shorter duration of illness.

Bulimic patients who had a greater severity of eating disorder pathology as measured by the YBC-EDS at the end of treatment also were more likely to relapse than those with a lower rating on that scale. The restraint subscale of the Three-Factor Eating Questionnaire, which measures a type of eating disturbance, was again associated in a positive correlation with greater relapse after treatment.

An especially interesting finding of this study is shown in the Figure, which demonstrates that a consistent pattern of abstinence beginning in weeks 10 through 12 of treatment predicts maintenance of abstinence at the 4-month follow-up. The signal detection analysis showed that the best predictor of relapse was a total YBC-EDS posttreatment score greater than or equal to 7. A further aspect of that analysis showed that patients who scored less than 7 and had not been consistently abstinent from purging between weeks 10 and 14 were more likely to relapse.

Only one other study has examined the length of abstinence from bingeing and purging during CBT and the relationship to eventual outcome. This study was conducted in patients with binge eating disorder. Four continuous weeks of abstinence during a 12-week group CBT for binge eating disorder was associated with a successful outcome at the end of treatment.¹²

Although this study has some unique features, there are several limitations that should be considered. Although the sample size was moderately large, it was not large enough to differentiate factors that may discriminate between full and partial relapse. In addition, the sample size may not be large enough to adequately test the influence of categorical baseline variables such as obsessive-compulsive personality or disorder. Finally, although this sample was followed up 13 months longer, additional assessment dropouts militated against an analysis at that time.

The results in the present study suggest that the severity of illness (measured by the YBC-EDS) and length of continuous abstinence response during treatment can be useful in identifying patients who will need additional treatment. Fortunately, these are predictors that can be practically used. The clinician can easily note binge eating and purging frequencies, and the YBC-EDS is a straightforward semistructured interview requiring 15 minutes to administer. Thus, the predictors of relapse can be readily determined by clinicians. A useful intervention for bulimic patients who meet the criteria for probable relapse might be fluoxetine hydrochloride (60 mg/d). One study showed that individuals with bulimia nervosa who did not respond to or had relapsed after CBT or interpersonal therapy had a significantly better response to fluoxetine than to placebo.¹³ It is also possible that extending the length of treatment with CBT for those with a short period of continuous abstinence may be helpful. The definitive effectiveness of these interventions needs to be determined with a large sample of patients with bulimia nervosa in well-designed, randomly assigned, controlled studies.

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Corresponding author and reprints: Katherine A. Halmi, MD, Department of Psychiatry, Weill Medical College of Cornell University, New York Presbyterian Hospital—Westchester Division, 21 Bloomingdale Rd, White Plains, NY 10605 (e-mail: kah29@cornell.edu).

REFERENCES

1. Wilson GT, Fairburn CG, Agras WS. Cognitive-behavioral therapy for bulimia nervosa. In: Garner DM, Garfinkel PE, eds. *Handbook of Treatment for Eating Disorders*. New York, NY: Guilford Press; 1997:67-93.
2. Fairburn CG, Peveler RC, Jones R, Hope RA, Doll HA. Predictors of 12-month outcome in bulimia nervosa and the influence of attitudes to shape and weight. *J Consult Clin Psychol*. 1993;61:696-698.
3. Agras WS, Crow SJ, Halmi KA, Mitchell J, Wilson T, Kraemer. Outcome predictors for the cognitive behavioral treatment of bulimia nervosa: data from a multisite study. *Am J Psychiatry*. 2000;157:1302-1308.
4. Cooper Z, Fairburn CG. The Eating Disorder Examination: a semi-structured interview for the assessment of the specific psychopathology of eating disorders. *Int J Eat Disord*. 1987;6:1-8.
5. Mazure CN, Halmi KA, Sunday SR, Romano SJ, Einhorn AM. The Yale-Brown-Cornell Eating Disorder Scale: development, use, reliability and validity. *J Psychiatr Res*. 1994;28:425-445.
6. Goodman WK, Price LH, Rasmussen SA, Mazure C, Fleischmann RL, Hill CL, Heninger GR, Charney DS. The Yale-Brown Obsessive Compulsive Scale, I: development, use, and reliability. *Arch Gen Psychiatry*. 1989;46:1006-1011.
7. Stunkard AJ, Messick S. The Three-Factor Eating Questionnaire to measure dietary restraint, disinhibition and hunger. *J Psychosom Res*. 1985;29:71-83.
8. Tellegen A, Waller N. Exploring personality through test construction: development of the Multidimensional Personality Questionnaire. In: Briggs R, Cheek JM, eds. *Personality Measures: Development and Evaluation*. Greenwich, Conn: JAI Press; 1994;1:172-208.
9. Rosenberg M. *Conceiving the Self*. New York, NY: Basic Books; 1979.
10. Agras WS, Walsh BT, Fairburn CG, Wilson GT, Kraemer HC. A multicenter comparison of cognitive-behavioral therapy and interpersonal psychotherapy for bulimia nervosa. *Arch Gen Psychiatry*. 2000;57:459-466.
11. Olmsted MP, Kaplan AS, Rockert W. Rate and prediction of relapse in bulimia nervosa. *Am J Psychiatry*. 1994;151:738-743.
12. Eldredge KL, Agras WS, Arnow B, Telch CF, Bell S, Castonguay L, Marnell M. The effects of extending cognitive-behavioral therapy for binge eating disorder among initial treatment nonresponders. *Int J Eat Disord*. 1997;21:347-352.
13. Walsh BT, Agras WS, Devlin MJ, Fairburn CG, Wilson GT, Kahn C, Chally MK. Fluoxetine for bulimia nervosa following poor response to psychotherapy. *Am J Psychiatry*. 2000;157:1332-1334.