Finally, statistical problems resulted from the small sample size and multiple comparisons on many pairs of data. Such statistical problems increased the risk of type I error and capitalizing on chance. The findings at 12 weeks that the at-risk group reported more symptoms of avoidance but fewer symptoms of tearfulness than the control group are notable, but they should be interpreted with caution because of the limitations of the study design.

These limitations, plus the fact that data collection started four weeks after the crash, reflect the spontaneous and chaotic nature of responding to a disaster of this magnitude. The differ-ences in reported symptoms between the at-risk group and the control group should nonetheless be considered important, as they point to the need for better understanding of the emotional experiences of the trauma counselor and can be used to facilitate hypotheses for future research. ◆

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Comorbidity of DSM-III-R Axis I and II Disorders Among Female Inpatients With Eating Disorders

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Structured diagnostic interviews were used to determine *DSM-III-R* axis I and II diagnoses among 136 female psychiatric inpatients. To distinguish comorbidity of eating disorders with axis I and II disorders from simple diagnostic overlap, the frequency and distribution of diagnoses among the 31 patients with an eating disorder and the 105 without an eating disorder were compared. Social phobia, substance use disorders, borderline personality disorder, and avoidant personality disorder were diagnosed in a significantly larger proportion of the group with eating disorders. Future studies should focus on interpreting the meaning of the co-occurrence of these disorders in patients with eating disorders. (*Psychiatric Services* 47:426–429, 1996)

Psychiatric comorbidity in patients with eating disorders is of much clinical interest. Comorbidity studies are the starting point for understanding the meaning of the co-occurrence of separately defined diagnostic entities (1).

Relatively few studies have used structured diagnostic interviews to examine the comorbidity of eating

disorders and either axis I (2) or axis II (3) disorders or both (4). Using *DSM-III-R* criteria, Keck and associates (2) found a high rate of mood disorders (71 percent) and substance use disorders (51 percent) in samples of patients with bulimia nervosa. Gartner and colleagues (3) found that 57 percent of a sample of 35 inpatients with eating disorders met criteria for at least one personality disorder; borderline and avoidant personality disorders were the most common.

These studies defined comorbidity as diagnostic overlap. However, in samples of patients with severe illnesses, high base rates of diagnoses make it difficult to interpret the co-occurrence of disorders. Such interpretation requires the use of control groups or base rate data for comparison. Allison (5) argues that the nature of the control group can influence the findings. Indeed, in a review of the literature on eating disorders, we found that studies that used nonpatient controls reported a significantly higher rate of co-occurrence of personality disorders among patients with eating disorders, whereas studies with patient control groups did not. The use of appropriate comparison groups obtained from the same overall sample is necessary to provide a context for interpreting the co-occurrence of disorders.

In this study we defined comorbidity as the co-occurrence of diagnoses at a level significantly greater than that observed in a comparison group from the same sample (1,5). We examined the frequency of co-occurring *DSM-III-R* axis I and II diagnoses among female inpatients. We aimed to determine the most frequently assigned additional diagnoses among inpatients with eating disorders and to determine whether certain disorders co-occurred significantly more often among inpatients with eating disorders than in a control group of psychiatric inpatients.

Methods

Subjects

Subjects were 136 consecutive female inpatient admissions to a tertiary-care psychiatric hospital between 1986 and 1990. At admission patients were given structured inter-

views as part of their evaluations. Thirty-one patients had a diagnosis of an eating disorder: 11 patients had anorexia nervosa, nine had bulimia nervosa, and 11 had an eating disorder not otherwise specified (that is, they met most but not all criteria for a specific eating disorder diagnosis).

Procedures

To determine axis I diagnoses, patients under 18 years old were given the Schedule for Affective Disorders and Schizophrenia for School-Age Children–Epidemiologic Version (6), and those 18 years old and older were given the Structured Clinical Interview for DSM-III-R–Patient Version (7). All patients were given the Personality Disorder Examination (PDE) (8) to assess *DSM-III-R* personality disorders. For adolescent patients (that is, those under age 18), criteria listed in the PDE were considered present if they had been pervasive or persistent for at least three years.

Axis I and axis II diagnoses derived from the structured interviews were reliable, with average kappa coefficients of .77 and .84, respectively. Final diagnoses were established by the best-estimate method, based on the structured interviews and additional relevant data from the medical record, in accordance with the LEAD (longitudinal, expert, all data) standard.

We used chi square analyses (employing Fisher's exact tests when indicated) and phi coefficients to compare the distributions of axis I disorders among patients with and without eating disorders. Phi is an effect-size measure for contingency table analyses and reflects the strength of associations of an eating disorder diagnosis with other diagnoses.

Results

Patients' characteristics

No significant differences were observed between groups in age, socioeconomic status, race, marital status, or occupation. The mean±SD age of the 31 patients with eating disorders was 19.8±6.5 (range=13 to 31 years), which was nearly the same as the mean age of the 105 comparison patients (20±4.4 years; range=13 to 38 years). Parents' socioeconomic status, as measured by Hollingshead and

Redlich's Two Factor Index of Social Position, was similar in the two groups. The mean scores were 3±1.3 for the patients with eating disorders and 3.4±1.2 for the comparison patients, which indicate socioeconomic status of lower- to upper-middle class.

Twenty-eight of the patients with eating disorders (90 percent) were Caucasian, two (6 percent) were African American, and one (3 percent) was Asian American. The composition of the control group was similar, with 90 Caucasians (86 percent), ten African Americans (10 percent), four Hispanic Americans (4 percent) and one Asian American (1 percent). All of the patients with eating disorders and 95 (90 percent) of the comparison patients were single.

Twenty-one of the patients with eating disorders (68 percent) and 69 of the comparison patients (66 percent) were students. Seven patients with eating disorders (23 percent) and 16 comparison patients (15 percent) were unemployed. Among those with eating disorders, three (10 percent) had full- or part-time employment, compared with 16 of the comparison patients (15 percent).

Axis I disorders

The distribution of axis I diagnoses among the sample is summarized in Table 1. Among the 31 patients with an eating disorder, 30 (97 percent) met criteria for at least one additional disorder; 23 (74 percent) were given two or more additional diagnoses. The most common diagnostic categories among the patients with eating disorders were mood disorders, substance use disorders, disorders involving disruptive behavior, and anxiety disorders.

As shown in Table 1, social phobia and substance use disorders were diagnosed in a significantly higher proportion of patients in the group with eating disorders. The phi coefficients indicate a modest effect.

Axis II disorders

Table 1 also summarizes the distribution of personality disorder diagnoses in both groups. Twenty-six patients with eating disorders (84 percent) met criteria for at least one personality disorder, and 14 (45 percent) re-

Table 1

Distribution of *DSM-III-R* axis I and II disorders among 136 psychiatric inpatients with and without an eating disorder

Diagnosis[1]	With an eating disorder (N=31)		Without an eating disorder (N=105)		χ^2 (df=1)	Phi
	N	%	N	%		
Axis I diagnosis						
Mood disorders	24	77.4	74	70.5	0.57	.07
Bipolar disorder	2	6.5	10	9.5	0.59	.07
Major depression	21	67.7	57	54.3	1.77	.11
Dysthymia	14	45.2	33	31.4	2.00	.12
Psychotic disorders	4	12.9	13	12.4	0.01	.01
Schizoaffective disorder	4	12.9	4	3.8	3.58	.16
Anxiety disorders	6	19.4	26	24.8	0.39	.05
Generalized anxiety disorder	1	3.2	6	5.7	0.30	.05
Social phobia	5	16.1	3	2.9	7.61*	.24**
Simple phobia	1	3.2	7	6.7	0.51	.06
Panic disorder	3	9.7	4	3.8	1.69	.11
Panic disorder with agoraphobia	1	3.2	5	4.8	0.13	.03
Agoraphobia	0	—	2	1.9	—	.07
Posttraumatic stress disorder	2	6.5	5	4.8	0.14	.03
Disruptive behavior disorders[2]	8	25.8	40	38.1	1.58	.11
Conduct disorder	4	12.9	20	19.0	0.62	.17
Oppositional defiant disorder	4	12.9	18	17.1	0.32	.05
Attention-deficit hyperactivity disorder	3	9.7	9	8.6	0.04	.01
Substance use disorders	21	67.7	46	43.8	5.48*	.20*
Alcohol abuse or dependence	18	58.1	40	38.1	3.90	.17
Other substance abuse or dependence	14	45.2	32	30.5	2.31	.13
Axis II diagnosis						
Any personality disorder	26	83.9	64	61.0	5.62*	.20
Cluster A	3	9.7	4	3.8	1.69	.11
Paranoid	1	3.2	3	2.9	—	.01
Schizoid	1	3.2	0	—	—	.16
Schizotypal	1	3.2	2	1.9	—	.04
Cluster B	22	71.0	54	51.4	3.71*	.17*
Antisocial[3]	1	3.2	5	4.5	—	.03
Borderline	22	71.0	51	48.6	4.83*	.19*
Histrionic	3	9.7	10	9.5	0.89	.00
Narcissistic	1	3.2	1	0.9	—	.08
Cluster C	10	32.3	25	23.8	0.89	.08
Dependent	4	12.9	9	8.6	0.52	.06
Avoidant	6	19.4	7	6.7	4.46*	.18*
Passive-aggressive	3	9.7	14	13.3	0.29	.05
Obsessive-compulsive	1	3.2	2	1.9	—	.04
Personality disorder NOS	5	16.1	13	12.4	0.29	.05

[1] Some patients had more than one diagnosis.
[2] Analyses conducted only for adolescents
[3] Analyses conducted only for adults
* p<.05
** p<.01

ceived two or more personality disorder diagnoses. The most frequently diagnosed disorders were borderline, avoidant, and dependent personality disorders. Significant co-occurrence was observed between eating disor-

ders and borderline personality disorder and between eating disorders and avoidant personality disorder.

The association between eating disorders and borderline personality disorder may represent an artifact of the

criteria sets (9). Specifically, the impulsiveness criterion for borderline personality disorder can be met through impulsive binge eating, thereby making it more likely for an individual with an eating disorder to meet criteria for borderline personality disorder. We addressed this issue (criterion isomorphism) by reanalyzing the co-occurrence between these two disorders after suspending binge eating as a way of meeting the impulsiveness criterion for borderline personality disorder. Only one subject "lost" the diagnosis of borderline personality disorder after this adjustment, and the association between the two diagnoses remained significant (χ^2=4.31, df=1, p<.04; phi=.18, p<.04).

Exploratory analyses

Given the small size of the sample of patients with eating disorders, we tested for differences in diagnostic co-occurrence across the specific eating disorder diagnoses (anorexia nervosa, bulimia nervosa, and eating disorder not otherwise specified) in a post hoc exploratory manner. Analyses revealed no significant differences in the number or the distribution of co-occurring axis I or II diagnoses between the different eating disorder diagnoses.

Discussion and conclusions

This study's use of reliably administered structured diagnostic interviews to assess both axis I and II disorders in a sample of inpatients represents an addition to the literature on eating disorders. Our sample consisted of female adolescents and young adults—the gender and age range most at risk for eating disorders. We compared the frequency of co-existing disorders among patients who had an eating disorder with the frequency of co-existing disorders in a comparison group recruited from the same population that did not differ on confounding variables. This procedure corrected for potential selection and sampling confounds of previous studies (5).

The generalizability of the findings is limited because we sampled hospitalized patients. Our sample was severely impaired, and diagnostic overlap was high. Previous inpatient stud-

ies have generally reported higher rates of co-existing disorders than outpatient studies. Finally, tests for differences between patients with different eating disorders must be viewed as exploratory because their power to detect significant differences was limited by the sample size.

Our findings of high rates of co-occurring *DSM-III-R* axis I disorders are generally consistent with those of previous reports, especially the high rates of mood, substance use, and anxiety disorders. Due to the inclusion of adolescent patients in our sample, we also observed relatively high rates of disruptive behavior disorders. The finding of high rates of overlap between diagnoses of eating disorders and personality disorders, especially cluster B diagnoses, is consistent with previous studies.

Comparison with a control group allowed us to distinguish potential comorbidity from diagnostic overlap (1,5); we defined comorbidity as the co-occurrence of disorders at a level significantly greater than that observed in a similarly recruited comparison group. Substance use disorders, borderline personality disorder, social phobia, and avoidant personality disorder were diagnosed in a significantly larger proportion of patients with eating disorders.

These comorbidities appear to be contradictory but may reveal clues about the unique aspects of the psychopathology of eating disorders. The comorbidity with substance use disorders and borderline personality disorder reflects the lability in affect regulation and impulse control characteristic of persons with eating disorders (10). The comorbidity with social phobia and avoidant personality disorder, on the other hand, reflects the existence of superego structures that lead to the pervasive shame, guilt, sense of incompetence, and anxiety characteristic of these patients (10) and that result in a behavioral style organized around stringent inhibitions. Perhaps the substance use and the other forms of impulsivity common to patients with borderline personality disorder represent a homeostatic "rebellion" against primitive superego structures more than they represent lacunae in the conscience structures.

In conclusion, our findings indicate that inpatients with eating disorders have high rates of co-occurring axis I and II disorders. Future studies should focus especially on the high rates of co-occurrence of social phobia, substance use disorders, and borderline and avoidant personality disorders among these patients. ◆

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