

Bulimia Nervosa in a Canadian Community Sample: Prevalence and Comparison of Subgroups

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***Objective:** Previous epidemiological studies of bulimia nervosa have generated differing estimates of the incidence and prevalence of the disorder. These differences are attributable, in part, to varying definitions of the illness and a range of methodologies. The authors sought to define the prevalence of bulimia nervosa in a nonclinical community sample, examine the clinical significance of DSM-III-R threshold criteria, and examine comorbidity. **Method:** Subjects across Ontario (N=8,116) were assessed with a structured interview, the World Health Organization Composite International Diagnostic Interview, with specific questions added for bulimia nervosa. Subjects who met DSM-III-R criteria for bulimia nervosa were compared with those who were missing only the frequency criterion (two or more binge-eating episodes per week for 3 months). **Results:** In this sample, the lifetime prevalence of bulimia nervosa was 1.1% for female subjects and 0.1% for male subjects. The subjects with full- and partial-syndrome bulimia nervosa showed significant vulnerability for mood and anxiety disorders. Lifetime rates of alcohol dependence were high in the full-syndrome group. Rates of parental psychopathologies were high in both bulimic groups but tended to be higher in the subjects with full-syndrome bulimia nervosa. Both bulimic groups were significantly more likely to experience childhood sexual abuse than a normal female comparison group. **Conclusions:** This study confirms other prevalence estimates of bulimia nervosa and its comorbid diagnoses from studies that were based on sound methodologies. It also points to the arbitrary aspects of the frequency of binge eating as a diagnostic threshold criterion for the disorder.*

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Bulimia nervosa, an eating disorder that was first described in 1979, is characterized by episodes of binge eating and extreme efforts to counteract the effects of ingested calories, as well as a morbid fear of becoming fat (1). In the last decade, much research has been directed to the epidemiology of bulimia nervosa. In 1990, Fairburn and Beglin noted that more than 50 prevalence studies had been conducted (2). In such studies, estimates of the frequency of bulimia nervosa varied widely, depending on the methodology used. Much of the variability can be attributed to four major causes: 1) Methods of

sampling differed: most studies used college students, media surveys, or family practice clinic cohorts. These subject groups are easily obtainable but are not representative of the population at large. 2) Response rates varied significantly: some studies that reported low rates also had a clear likelihood of bias. Respondents may not be representative of the population from which they are drawn. People with bulimia nervosa may be more likely than the general population to avoid participation. 3) Methods of case detection varied: studies that used responses on self-report questionnaires to diagnose bulimia nervosa may have overestimated the frequency of the syndrome. Fairburn and Beglin (2) found prevalence rates obtained from questionnaires to be about three times as high as those determined by interview methods. 4) Definitions of the syndrome continue to evolve: the criteria established in DSM-III did not include either a threshold for the frequency of binge-eating episodes or the importance of the morbid fear of becoming fat. Prevalence studies that used DSM-III criteria show very high rates, often 2-4 times those that used the more rigorous criteria of Russell (1) or DSM-III-R.

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Because of these differences in methodologies, reported prevalence rates in studies from the 1980s showed as much as a 20-fold difference. However, the interview-based studies that used rigorous diagnostic criteria have been quite consistent: about 1%–1.5% of young women have bulimia nervosa (3–8). The two most rigorous studies to date have reported lifetime prevalence rates of 2.8% (9) and 1.6% (10) for female subjects.

As previously noted, the frequency of the disorder increases if less rigorous criteria are employed. Many of the criteria proposed for bulimia nervosa in DSM-IV have been supported by empirical data (11). However, the frequency criterion of two or more binge episodes per week for at least 3 months was arbitrarily adopted for both DSM-III-R and DSM-IV. There has been little research to support such a threshold in terms of course of illness, associated psychopathology, or response to treatment, and there is some evidence that the frequency of binge eating is not related to these measures (12).

There has been interest in possible links between bulimia nervosa and other major psychiatric disorders, especially affective disorder. Several lines of evidence have been used to suggest that major affective disorder and bulimia nervosa are related. First, depressive symptoms are common among patients with bulimia nervosa (13–15). Second, family history studies have revealed a high prevalence of affective disorder among the relatives of patients with bulimia nervosa (16). Third, results of biological and neuroendocrine function tests of depression have, at times, shown similarities between people with bulimia nervosa and major depression, although the interpretation of these results has been questioned (17). Finally, patients with bulimia nervosa often respond to medications that are used to treat depression (18–20). Investigators have found high comorbidity rates for major depression, dysthymia, anxiety disorders, and alcoholism (21–23 and unpublished 1993 paper by D.B. Woodside et al.). However, studies to date have relied on clinical populations that may be biased toward severity and comorbidity.

The purpose of the present study was threefold: 1) to determine by direct interview the prevalence of bulimia nervosa in a community sample; 2) to determine rates of comorbidity of depression, anxiety disorders, and alcoholism among subjects with bulimia nervosa; and 3) to compare subjects with bulimia nervosa with others who met all criteria for the disorder except the frequency threshold for binge-eating episodes (partial-syndrome bulimia nervosa).

METHOD

Sample

The data source for this study was the Mental Health Supplement to the Ontario Health Survey. The survey used a multistage, stratified sampling design that has been detailed elsewhere (24). Briefly, the 42 provincial public health units were divided into urban and rural strata. Enumeration areas were sampled within each public health unit/stratum combination, and then households were sampled within

enumeration areas. One individual, aged 15 years or older, was randomly selected from each household. Because there was a particular interest in young adults, the probability of sampling the 15–24-year-old subjects was triple the probability for all other age groups. Verbal consent was obtained; the survey method resulted in a response rate of 76.5%, which was a sample of 9,953 individuals. Concerns about the burden of a lengthy interview on older respondents led to a shortened form of the interview (which excluded the bulimia nervosa questions) for those over age 65. Consequently, the sample reported here is restricted to those under age 65 (N=8,116).

Not included in the sampling frame were individuals in institutions and those living on native reserves. In addition, the survey was conducted only in English and French (the official languages of Canada), which eliminated anyone not comfortable with these languages.

Instrumentation

Each individual was interviewed in face-to-face fashion by trained interviewers for approximately 1–2 hours. The diagnostic instrument used was the World Health Organization Composite International Diagnostic Interview (25), a structured interview that is capable of generating both DSM-III-R and ICD-10 diagnoses. The Composite International Diagnostic Interview has been found to have reasonable reliability and validity across a variety of sites and types of patients (25). The particular version used (the University of Michigan Composite International Diagnostic Interview) is the result of collaboration among psychiatric epidemiologists in Canada, the United States, and Europe (26 and an unpublished paper by Wittchen and Kessler). All respondents under 65 years of age were screened for the presence of anxiety disorders, affective disorders, eating disorders, the use and abuse of alcohol and other substances, and the presence of antisocial personality disorder.

For the diagnosis of bulimia nervosa, items from the Composite International Diagnostic Interview were slightly modified to fit with the flow pattern established for the University of Michigan version. These questions corresponded to the DSM-III-R and Russell (1) criteria. A diagnosis of bulimia nervosa required 1) the presence of binge eating with loss of control at a frequency of greater than twice per week (for at least 3 months), 2) the presence of behaviors to prevent weight gain, and 3) weight and shape concerns. Specific questions are available from the authors on request.

In addition to the University of Michigan Composite International Diagnostic Interview, the survey included questions about associated demographic information, family background, psychosocial functioning, psychiatric disabilities, and care utilization patterns of the respondent. Of particular interest in this report is the assessment of family history. Based on the family history questions developed by the St. Louis National Institute of Mental Health Epidemiologic Catchment Area site (27), these items ask about specific mental health problems experienced by the respondent's biological parents.

Statistical Procedures

As is customary in large surveys, sample weights were used that take into account the complex sampling design and patterns of non-response. Relative weights (28) were applied to the data and the standard procedure of reporting raw N's and weighted percentages was followed for all prevalence estimates. Comparisons of full- and partial-syndrome cases were based on unweighted data because of the relatively small number of respondents. The reader should bear this decision in mind in drawing inferences about population estimates from the sample data.

Group comparisons were analyzed by chi-square analysis for categorical data, Mann-Whitney U test for ordinal data, and by analysis of variance (ANOVA) followed by Scheffé test of multiple comparisons for continuous data. Because of the large numbers of comparisons, $p \leq 0.01$ was set as the level of statistical significance.

RESULTS

Interviews were conducted with 4,285 female subjects and 3,831 male subjects under age 65 (correspond-

TABLE 1. Compensatory Behaviors of Male and Female Subjects With Full- and Partial-Syndrome Bulimia Nervosa^a

Compensatory Behavior	Full-Syndrome Bulimia Nervosa (N=62)		Partial-Syndrome Bulimia Nervosa (N=28)		Analysis	
	N	%	N	%	χ^2 (df=1)	p
Vigorous exercise	48	77.4	15	53.6	5.22	n.s.
Strict diet	46	74.2	24	85.7	1.48	n.s.
Diuretics	12	19.4	7	25.0	0.37	n.s.
Laxatives or enemas	9	14.5	4	14.3	0.00	n.s.
Induced vomiting	13	21.0	4	14.3	0.56	n.s.
Fasting	24	38.7	12	42.9	0.14	n.s.
Diet pills	31	50.0	5	17.9	8.30	0.004

^aThe partial-syndrome subjects did not meet the frequency criterion but otherwise had all the diagnostic features of bulimia nervosa according to the University of Michigan Composite International Diagnostic Interview. All figures based on unweighted data.

ing to weighted proportions of 50.2% and 49.8%, respectively). The mean ages of the female and male subjects were comparable (36.7 years [SD=13.2] and 36.6 years [SD=13.7], respectively). Sixty-two percent of the sample were in the 15–40 age range and 20.0% were aged 50–64. In this sample, 8.2% (raw N=390) of the female subjects and 7.8% (raw N=324) of the male subjects responded affirmatively to the question about binge eating on more than one occasion. However, only 3.2% of the female subjects and 3.3% of the male subjects reported binge eating more than twice per week. This group compensated for binge eating by using the full spectrum of weight control methods. Fifty-three percent of binge-eating female subjects frequently relied on exercise for weight loss (versus 44.9% of male subjects). Significant differences between female and male binge eaters were found for other compensatory behaviors: strict dieting (47.7% versus 26.9%) ($\chi^2=31.1$, df=1, $p<0.001$); diuretic use (7.9% versus 2.9%) ($\chi^2=8.3$, df=1, $p<0.004$); taking laxatives or enemas (5.7% versus 0.9%) ($\chi^2=11.6$, df=1, $p<0.001$); self-induced vomiting (4.7% versus 0.4%) ($\chi^2=12.3$, df=1, $p<0.001$); fasting (15.7% versus 9.2%) ($\chi^2=6.5$, df=1, $p<0.01$); and taking diet pills (13.0% versus 5.1%) ($\chi^2=12.8$, df=1, $p<0.001$). In the entire sample, the lifetime prevalence of full-syndrome bulimia nervosa was 1.1% for female and 0.1% for male subjects.

There were 62 cases of full-syndrome bulimia nervosa; another 28 respondents (22 female) met all the criteria for bulimia nervosa except they did not engage in binge-eating episodes at least twice weekly; another 11 respondents (eight female) lacked only compensatory behaviors and 23 (16 female) lacked only the overconcern with weight and shape. Thus, 124 respondents (1.5%) had full-syndrome bulimia nervosa or lacked only one criterion. Of these, 101 were female (2.4% of the female sample). Because of their small numbers, male subjects were dropped from subsequent analyses. In order to explore more carefully the binge-eating frequency criterion, we defined as a partial-syndrome group the 22 women

who failed to meet the frequency criterion but otherwise had all the diagnostic features of bulimia nervosa. We then compared these two groups and a comparison group that consisted of all the remaining women in the sample. When the subjects with full- and partial-syndrome bulimia nervosa and the comparison subjects were compared in terms of age, no significant differences were found.

There was no difference in mean age at onset between the female subjects with full- and partial-syndrome bulimia nervosa (21.4 years [SD=10.1] and 21.4 years [SD=13.0], respectively). The two bulimic groups were combined in order to evaluate a possible age at onset effect. Subjects were divided into three groups, as had been done by Kendler et al. (9). An ANOVA showed that the subjects born before 1950 had a significantly later age at onset (32.6 years, SD=13.0) than subjects born between 1950 and 1959 (age at onset=18.8, SD=10.7) ($F=18.5$, df=2, 72, $p=0.001$) and subjects born after 1960 (age at onset=17.5, SD=5.3) ($F=63.4$, df=2, 72, $p<0.001$) (Scheffé $p<0.01$).

Table 1 lists compensatory behaviors of the subjects with full- and partial-syndrome bulimia nervosa. While the use of diet pills was more common in the full-syndrome group, the two groups were otherwise remarkably similar. Noteworthy is the relatively low rate of self-induced vomiting; subjects relied more on other compensatory behaviors.

Table 2 displays the frequencies of other psychiatric disorders among the female subjects with full- and partial-syndrome bulimia nervosa and the remaining comparison group. Subjects with full- or partial-syndrome bulimia nervosa had a threefold increase in the lifetime occurrence of major depression and at least a doubling of the rate for anxiety disorders. Rates of current depression and anxiety disorders were even more prominently higher in the two bulimic groups. The subjects with full-syndrome bulimia nervosa had significantly higher rates of social and simple phobias, agoraphobia, panic disorder, and generalized anxiety disorder than the comparison subjects. The partial-syndrome group displayed significantly higher rates of social phobia and lifetime occurrence of simple phobia than the comparison subjects but not agoraphobia, panic disorder, or generalized anxiety disorder. Lifetime rates for alcohol dependence were significantly higher in subjects with full-syndrome bulimia nervosa in relation to the comparison group. The two bulimic groups did not differ significantly on any comorbid diagnoses.

Childhood sexual abuse was experienced by the subjects with full- and partial-syndrome bulimia nervosa (32.7%, N=18, and 36.4%, N=8, respectively) at almost three times the rate of the female comparison group (13.9%, N=585) (full syndrome versus comparison: $\chi^2=15.7$, df=1, $p<0.001$; partial syndrome versus comparison: $\chi^2=9.1$, df=1, $p<0.003$; full syndrome versus partial syndrome: $\chi^2=0.1$, df=1, n.s.). This association, however, held true only for full-syndrome subjects when "serious" sexual abuse (defined as "tried to have sex with you or sexually attacked you") was assessed by itself: full-syndrome, 30.9% (N=17); partial syndrome, 22.7% (N=5);

TABLE 2. Frequency of Psychiatric Disorders Among Female Subjects With Full- or Partial-Syndrome Bulimia Nervosa and Normal Comparison Subjects^a

Disorder, From the University of Michigan Composite International Diagnostic Interview	Full-Syndrome Bulimia Nervosa (N=55)		Partial-Syndrome Bulimia Nervosa (N=22)		Comparison Subjects (N=4,208)		Group Comparisons					
							Full-Syndrome Bulimia and Comparison Subjects		Partial-Syndrome Bulimia and Comparison Subjects		Full- and Partial-Syndrome Bulimia Subjects	
	N	%	N	%	N	%	χ^2 (df=1)	p	χ^2 (df=1)	p	χ^2 (df=1)	p
Major depression												
Lifetime	21	38.2	8	36.4	425	10.1	45.5	0.001	16.4	0.001	0.1	n.s.
Current	11	20.0	4	18.2	93	2.2	74.0	0.001	25.6	0.001	0.1	n.s.
Anxiety disorders												
Lifetime	32	58.2	16	72.7	1,086	25.8	29.4	0.001	25.0	0.001	1.4	n.s.
Current	18	32.7	7	31.8	337	8.0	43.4	0.001	16.6	0.001	0.1	n.s.
Social phobia												
Lifetime	25	45.5	12	54.5	640	15.2	37.8	0.001	26.0	0.001	0.5	n.s.
Current	16	29.1	6	27.3	164	3.9	85.2	0.001	31.0	0.001	0.0	n.s.
Simple phobia												
Lifetime	22	40.0	9	40.9	480	11.4	42.9	0.001	18.7	0.001	0.0	n.s.
Current	10	18.2	3	13.6	164	3.9	28.1	0.001	5.4	n.s.	0.2	n.s.
Agoraphobia												
Lifetime	19	34.5	3	13.6	316	7.5	55.3	0.001	1.2	n.s.	3.4	n.s.
Current	7	12.7	0	0.0	76	1.8	35.0	0.001	0.4	n.s.	3.1	n.s.
Panic disorder												
Lifetime	11	20.0	1	4.5	109	2.6	60.8	0.001	0.3	n.s.	2.9	n.s.
Current	6	10.9	0	0.0	42	1.0	50.4	0.001	0.2	n.s.	2.6	n.s.
Generalized anxiety disorder												
Lifetime	6	10.9	2	9.1	105	2.5	15.2	0.001	3.9	n.s.	0.1	n.s.
Current	2	3.6	0	0.0	25	0.6	7.6	0.006	0.1	n.s.	0.8	n.s.
Alcohol dependence												
Lifetime	17	30.9	2	9.1	21	5.0	71.5	0.001	0.8	n.s.	4.0	n.s.
Current	2	3.6	1	4.5	34	0.8	5.0	n.s.	3.6	n.s.	0.1	n.s.

^aThe partial-syndrome subjects did not meet the frequency criterion but otherwise had all the diagnostic features of bulimia nervosa according to the University of Michigan Composite International Diagnostic Interview. All figures based on unweighted data.

comparison group, 12.5% (N=526) (full syndrome versus comparison: $\chi^2=16.5$, $df=1$, $p<0.001$; partial syndrome versus comparison: $\chi^2=2.1$, $df=1$, n.s.; full syndrome versus partial syndrome: $\chi^2=0.5$, $df=1$, n.s.). The subjects with full-syndrome bulimia nervosa also reported significantly more parental disharmony (54.5%, N=30) than the partial-syndrome group (45.5%, N=10) and the comparison group (27.1%, N=1,140) (full syndrome versus comparison group: $\chi^2=20.5$, $df=1$, $p<0.001$; partial syndrome versus comparison group: $\chi^2=3.7$, $df=1$, n.s.; full syndrome versus partial syndrome: $\chi^2=0.5$, $df=1$, n.s.). The full-syndrome subjects described having a close and confiding relationship with an adult less frequently (70.9%, N=39) than the partial-syndrome group (77.3%, N=17) ($\chi^2=0.3$, $df=1$, n.s.) and significantly less frequently than the comparison group (85.2%, N=3,585) ($\chi^2=8.8$, $df=1$, $p<0.003$). Significantly more of the subjects with full-syndrome bulimia nervosa reported staying in foster or group homes than the female comparison group (16.4% [N=9] versus 2.4% [N=101]) ($\chi^2=42.1$, $df=1$, $p<0.001$).

Table 3 records aspects of the family history in the two bulimic cohorts and the female comparison group. The subjects with full-syndrome bulimia nervosa differed from the comparison group by reporting their

parents to have higher rates of alcohol problems, depression, suicide attempts, treatment for an emotional disorder, and antisocial behaviors. The familial rates of the subjects with partial-syndrome bulimia nervosa were closer to the comparison group. When these parental psychopathologies were examined as a group, the two bulimic groups displayed similar and higher rates. Presence of mental health problems only in fathers occurred in 12.7% (N=7) of the full-syndrome group, 9.1% (N=2) of the partial-syndrome group, and 13.4% (N=564) of the comparison group. The mental health problems were present only in mothers in 7.3% (N=4) of the full-syndrome group, 13.6% (N=3) of the partial-syndrome group, and 14.2% (N=597) of the comparison group. By contrast, both parents had one or more mental health problems in 45.5% (N=25) of the full-syndrome group, 36.4% (N=8) of the partial-syndrome group, and only 12.7% (N=534) of the comparison group. Finally, neither parent was reported to have a disorder in 34.5% (N=19) of the full-syndrome group, 40.9% (N=9) of the partial-syndrome group, and 59.7% (N=2,512) of the comparison group (full syndrome versus comparison: $\chi^2=52.0$, $df=3$, $p<0.001$; partial syndrome versus comparison: $\chi^2=11.2$, $df=3$, $p<0.01$; full versus partial syndrome: $\chi^2=1.4$, $df=3$, n.s.).

TABLE 3. Parental History and Psychopathology Among Female Subjects With Full- or Partial-Syndrome Bulimia Nervosa and Normal Comparison Subjects^a

Parental Variable	Full-Syndrome Bulimia Nervosa (N=55)		Partial-Syndrome Bulimia Nervosa (N=22)		Comparison Subjects (N=4,208)		Group Comparisons					
	N	%	N	%	N	%	Full-Syndrome Bulimia and Comparison Subjects		Partial-Syndrome Bulimia and Comparison Subjects		Full- and Partial-Syndrome Bulimia Subjects	
							χ^2 (df=1)	p	χ^2 (df=1)	p	χ^2 (df=1)	p
Drug problem	3	5.6	2	9.1	97	2.3	2.5	n.s.	4.4	n.s.	0.3	n.s.
Drinking problem	23	41.8	6	27.3	879	20.9	14.3	0.001	0.7	n.s.	1.1	n.s.
Depression	27	49.1	6	27.3	774	18.4	32.3	0.001	1.2	n.s.	3.0	n.s.
Suicide attempt	10	18.2	1	4.5	164	3.9	31.1	0.001	0.0	n.s.	2.6	n.s.
Treatment for emotional disorder or drug dependency	31	56.0	8	36.4	1,060	25.2	24.6	0.001	1.4	n.s.	2.4	n.s.
Hospitalized or not working because of emotional disorder or drug or alcohol dependency	18	33.3	4	18.2	505	12.0	22.5	0.001	0.8	n.s.	1.7	n.s.
Frequent fighting, involvement with police, or unemployment	10	18.2	1	4.5	147	3.5	33.3	0.001	0.1	n.s.	2.2	n.s.

^aThe partial-syndrome subjects did not meet the frequency criterion but otherwise had all the diagnostic features of bulimia nervosa according to the University of Michigan Composite International Diagnostic Interview. All figures based on unweighted data.

A separate analysis examined the early experiences and family histories of the two female bulimic cohorts and another comparison group of female subjects with a lifetime diagnosis of depression but without bulimia nervosa (N=426). The groups were similar, including having very similar rates of childhood sexual abuse (33.4% [N=142] in the depression group).

The reports of the two bulimic groups and the female comparison subjects on several measures of current social and interpersonal functioning demonstrated high levels of dissatisfaction, especially in the full-syndrome group. On their rating of satisfaction with life in general as moderately to extremely dissatisfying, the subjects with full- and partial-syndrome bulimia nervosa did not differ significantly (12.7% [N=7] and 9.1% [N=2], respectively). Significantly more of the full-syndrome group gave this rating than the comparison group (2.5% [N=105]) (Mann-Whitney U=70,783.5, $z=5.48$, corrected for ties, $p<0.001$).

DISCUSSION

The present study found that bulimia nervosa as defined by DSM-III-R criteria had a 1.1% lifetime prevalence in women aged 15–65 from a variety of communities in Ontario, Canada. For men, the corresponding figure was 0.1%.

It is difficult to compare these figures with many studies in the literature because of the methodologic problems described earlier. Several studies, however, are comparable. Bushnell et al. (10) found a 1.6% lifetime prevalence of bulimia nervosa for women in New Zealand according to DSM-III-R criteria. Kendler et al. (9) found a lifetime prevalence for definite and probable cases of 2.8%. In their study, cumulative lifetime risk

showed a cohort effect, with those individuals born after 1960 differing from those born earlier. The present study found a very similar reduction in age at onset. However, the two groups born between 1950 and 1959 and after 1960 were very similar, with an average age at onset of 18. These figures are in keeping with the ages at onset in clinical studies (29). The age at onset differences also could reflect the changing culture of the late 1960s that idealized female thinness (30). While this could represent a cohort effect for the onset of the disorder, greater awareness of bulimia nervosa as an illness and improved diagnosis may also contribute to these results.

Our findings highlight how different a clinical population may be from those in the community in terms of compensatory behaviors. A minority of subjects with full-syndrome bulimia nervosa engaged in self-induced vomiting or regular use of laxatives or enemas. These rates were markedly lower from those in clinical samples but similar to those obtained in other community populations (2, 31).

Previous studies of bulimia nervosa have documented comorbidity with major depression, anxiety disorders, and alcohol and drug abuse. However, in clinical samples, comorbidity may be overrepresented because of the higher probability of help-seeking when an individual has two disorders (32). In the present study, we documented considerable lifetime comorbidity of bulimia nervosa with affective disorders, anxiety disorders, and alcoholism in a nonclinical population. Current rates of these disorders were similarly high. The rates were notably greater but not as high as rates in clinical populations. The greater rates of comorbidity observed in this study were not specific or preferential for depression. Women with bulimia nervosa were equally vulnerable to develop an anxiety disorder or al-

cohol abuse. A similar finding was reported by Kendler et al. (9). Higher levels of anxiety disorders and depression were observed in both the full- and partial-syndrome bulimia nervosa subjects.

These analyses are limited by the low numbers that are found whenever less frequently occurring disorders are studied in a community sample. Because the results are based on unweighted data, they are not precise reflections of the population estimates and should be interpreted cautiously.

In addition to the subjects with full-syndrome bulimia nervosa, this sample included a group who met all the criteria except for the frequency of binge eating. These two bulimic groups appeared quite similar on a variety of characteristics. For example, there were few differences in their compensatory behaviors. The partial-syndrome group had higher rates of major depression and overall anxiety disorders, as did the full-syndrome group, than the comparison group. While their lifetime rate of alcoholism was not that of the full-syndrome group, it still tended to be higher than that of the general female population. There was no significant difference between the two bulimic groups on any of the comorbid diagnoses that were assessed.

The responses to developmental questions support the similarities of the two bulimia nervosa groups. Both showed greater levels of childhood sexual abuse. The nearly tripling of the rate of abuse in these bulimic subjects is in keeping with several earlier case series (33–36) but not others (37). The figure of 33% for women with bulimia nervosa is slightly higher than the frequency of abuse reported in our clinical population by the Toronto group (38). The high rate reported here, in a nonclinical sample, suggests that an association exists but does not indicate what the mediating links are. It is possible that childhood abuse leads to several forms of psychopathology, bulimia nervosa included, by magnifying one's sense of personal helplessness and body dissatisfaction and by reducing self-esteem. This association does not appear to be specific to bulimia nervosa, since the reported rates of abuse in bulimia nervosa subjects were comparable to those of women with depression.

In keeping with earlier clinical studies (16, 39, 40), the bulimia nervosa subjects reported higher rates of parental psychopathologies, including depression, alcoholism, suicide attempts, and sociopathic behaviors. The rate of parental psychopathologies for subjects with partial-syndrome bulimia nervosa tended to fall midway between the full-syndrome and the comparison groups. However, the two bulimic groups were similar in showing a high proportion of families in which both parents displayed one of these psychopathologies.

The two bulimic groups were similar in compensatory behaviors, childhood experiences, and comorbidity for depression and anxiety disorders. In addition, the two bulimic groups reported dissatisfaction with psychosocial functions, with a tendency for the rates to be higher in the full-syndrome group. These included the presence of conflictual relationships, as well as dis-

satisfaction with work or school, leisure activities, and life in general.

While there were similarities between full- and partial-syndrome bulimia nervosa groups, there were also some differences. While not statistically significant, reported parental psychopathologies tended to be greater in the full-syndrome group. The lifetime risk of alcohol abuse and agoraphobia also tended to be higher for subjects with full-syndrome bulimia nervosa. The full-syndrome subjects spent more time at foster or group homes as children, which suggests, at least for some of these subjects, a more chaotic family background with multiple parental problems and many associated psychiatric disorders within the individual. The lack of significant differences may be due to the lack of statistical power because of the small sample sizes.

What are the implications of these findings for the diagnostic boundaries of bulimia nervosa? In the early 1980s, the absence of a frequency criterion for binge eating had contributed to reports of epidemics of the disorder, and many researchers and clinicians were concerned about overdiagnosis. Adding the frequency criterion reduced prevalence estimates 10-fold in some cases (41). This study of a nonclinical sample suggests that while the frequency criterion continues to identify a disturbed group with regard to comorbidities and environmental difficulties, it remains an arbitrary threshold that excludes from diagnosis subjects who in every other way resemble women with bulimia nervosa; under the current diagnostic standards, they fall into the less satisfying category of eating disorder not otherwise specified.

Kendler and colleagues (9) have reported that risk factors for bulimia nervosa and partial-syndrome bulimia nervosa were generally shared. They also found the cohort effect was nearly identical for the two bulimic groups. Their conclusions, based on a different methodology, are similar to the findings of the present research: that the two syndromes reflect different levels of severity on a single continuum of vulnerability; this supports a spectrum concept of this disorder. It is not clear if there are distinctive and meaningful differences between the two bulimic groups, and, at the very least, the current data point out the arbitrariness of the twice per week frequency criterion. Because of the way questions were asked in this study, it is not possible to determine a more appropriate diagnostic threshold for frequency of binge eating. However, further work should be done to determine a more informative threshold.

CONCLUSIONS

The present study found a 1.1% lifetime prevalence rate of DSM-III-R bulimia nervosa for women in the community, and this rate is comparable to previous interview studies. A significant number of women with symptoms of bulimia nervosa do not meet the frequency criterion of two binge episodes per week for 3 months. The present study emphasizes the arbitrary

nature of such a criterion in distinguishing threshold and subthreshold groups. While these groups differed in the frequencies of binge eating, there were similarities in rates of comorbidity and in childhood experiences, including sexual abuse and satisfaction with activities. These findings support a spectrum concept of the disorder, with various levels of vulnerability. These findings suggest a need for further refinement of the diagnostic criteria for bulimia nervosa and for investigations related to treatment-seeking behavior and treatment responses.

REFERENCES

- Russell GFM: Bulimia nervosa: an ominous variant of anorexia nervosa. *Psychol Med* 1979; 9:429-448
- Fairburn CG, Beglin SJ: Studies of the epidemiology of bulimia nervosa. *Am J Psychiatry* 1990; 147:401-408
- Drewnowski A, Yee DK, Krahn DD: Bulimia in college women: incidence and recovery rates. *Am J Psychiatry* 1988; 145:753-755
- Rand CSW, Kulda JM: Eating patterns in normal weight individuals: bulimia, restrained eating and the night eating syndrome. *Int J Eating Disorders* 1986; 5:75-84
- Johnson-Sabine E, Wood K, Patton G, Mann A, Wakeling A: Abnormal eating attitudes in London schoolgirls—a prospective epidemiological study: factors associated with abnormal response on screening questionnaires. *Psychol Med* 1988; 18:615-622
- Schotte DE, Stunkard AJ: Bulimia vs bulimic behaviours on a college campus. *JAMA* 1989; 258:1213-1215
- Szmukler GI: Weight and food preoccupation in a population of English schoolgirls, in *Understanding Anorexia Nervosa and Bulimia*. Edited by Redfern DE. Columbus, Ohio, Ross Laboratories, 1983
- King MB: Eating disorders in general practice. *Br Med J* 1986; 293:1412-1414
- Kendler KS, MacLean C, Neale M, Kessler R, Heath A, Eaves L: The genetic epidemiology of bulimia nervosa. *Am J Psychiatry* 1991; 148:1627-1637
- Bushnell JA, Wells E, Hornblow AR, Oakley-Browne MA, Joyce P: Prevalence of three bulimia syndromes in the general population. *Psychol Med* 1990; 20:671-680
- Garfinkel PE, Goldbloom D, Davis R, Olmsted MP, Garner DM, Halmi KA: Body dissatisfaction in bulimia nervosa: relationship to weight and shape concerns and psychological functioning. *Int J Eating Disorders* 1992; 11:151-161
- Wilson GT, Eldredge MS: Frequency of binge eating in bulimic patients: diagnostic validity. *Int J Eating Disorders* 1991; 10:557-561
- Abbey SE, Toner BB, Garfinkel PE, Kennedy SH, Kaplan AS: Self report symptoms that predict major depression in patients with prominent physical symptoms. *Int J Psychiatry Med* 1990; 20:247-258
- Cooper PJ, Fairburn CG: The depressive symptoms of bulimia nervosa. *Br J Psychiatry* 1986; 148:268-274
- Kennedy SH, Kaplan AS, Garfinkel PE, Rockert W, Toner B, Abbey SE: Depression in anorexia nervosa and bulimia nervosa: discriminating depressive symptoms and episodes. *J Psychosom Res* 1994; 38:773-782
- Hudson JL, Pope HG Jr, Jonas JM, Yurgelun-Todd D, Frankenburg FR: A controlled family history study of bulimia. *Psychol Med* 1987; 17:883-890
- Kaplan AS, Garfinkel PE: Medical Issues and the Eating Disorders: The Interface. New York, Brunner/Mazel, 1993
- Walsh BT, Steward JW, Roose SP, Gladis M, Glassman AH: A double-blind trial of phenelzine in bulimia. *J Psychiatr Res* 1985; 19:485-489
- Kennedy SH, Goldbloom DS: Current perspectives on drug therapies for anorexia nervosa and bulimia nervosa. *Drugs* 1991; 41:367-377
- Fluoxetine Bulimia Nervosa Collaborative Study Group: Fluoxetine in the treatment of bulimia nervosa. *Arch Gen Psychiatry* 1992; 49:139-147
- Piran N, Kennedy S, Garfinkel PE, Owens M: Affective disturbance in eating disorders. *J Nerv Ment Dis* 1985; 173:395-400
- Strober M, Katz JL: Depression in the eating disorders, in *Diagnostic Issues in Anorexia Nervosa and Bulimia Nervosa*. Edited by Garner DM, Garfinkel PE. New York, Brunner/Mazel, 1988
- Goldbloom D: Alcohol misuse and eating disorders: aspects of an association. *Alcohol Alcohol* 1993; 28:375-381
- Offord DR, Boyle M, Campbell D, Cochrane J, Goering PN, Lin E, Rhodes A, Wong M: Mental Health in Ontario: Selected Findings From the Mental Health Supplement to the 1990 Ontario Health Survey. Toronto, Queen's Printer for Ontario, 1994.
- Wittchen H-U: Reliability and validity studies of the WHO-Composite International Diagnostic Interview (CIDI): a critical review. *J Psychiatr Res* 1994; 28:57-84
- Kessler RC, McGonagle KA, Zhao S, Nelson CB, Hughes M, Eshleman S, Wittchen H, Kendler KS: Lifetime and 12-month prevalence of DSM-III-R psychiatric disorders in the United States: results from the National Comorbidity Survey. *Arch Gen Psychiatry* 1994; 51:8-19
- St Louis Health Study: Wave II, NIMH Epidemiologic Catchment Area Program. St Louis, Washington University, and Baltimore, Survey Research Associates, 1983
- Lee ES, Forthofer RN, Lorimor RJ: *Analyzing Complex Survey Data*: Sage Publication 71. Newbury Park, Calif, Sage, 1983
- Woodside DB, Garfinkel PE: Age of onset in eating disorders. *Int J Eating Disorders* 1992; 12:31-36
- Garner DM, Garfinkel PE: Sociocultural factors in the development of anorexia nervosa. *Psychol Med* 1980; 10:647-656
- Warheit GJ, Langer LM, Zimmerman RS, Biafora FA: Prevalence of bulimic behaviours and bulimia among a sample of the general population. *Am J Epidemiol* 1993; 137:569-576
- Regier DA, Farmer ME, Rae DS, Locke BZ, Keith SJ, Judd LL, Goodwin FK: Comorbidity of mental disorders with alcohol and other drug abuse: results from the Epidemiologic Catchment Area (ECA) study. *JAMA* 1990; 264:2511-2518
- Oppenheimer R, Howells K, Palmer RL, Chaloner DA: Adverse sexual experience in childhood and clinical eating disorders: a preliminary description. *J Psychiatr Res* 1985; 19:357-361
- Hall RC, Tice L, Beresford TP, Wooley B, Hall AK: Sexual abuse in patients with anorexia nervosa and bulimia. *Psychosomatics* 1989; 30:73-79
- Palmer RL, Chaloner DA, Oppenheimer R: Childhood sexual experiences with adults reported by female psychiatric patients. *Br J Psychiatry* 1992; 160:261-265
- Waller G: Sexual abuse as a factor in eating disorders. *Br J Psychiatry* 1991; 159:664-671
- Pope HG Jr, Hudson JI: Is childhood sexual abuse a risk factor for bulimia nervosa? *Am J Psychiatry* 1992; 149:455-463
- deGroot JM, Kennedy S, Rodin G, McVey G: Correlates of sexual abuse in women with anorexia nervosa and bulimia nervosa. *Can J Psychiatry* 1992; 37:516-518
- Keck PE Jr, Pope HG Jr, Hudson JI, McElroy SL, Yurgelun-Todd D, Hundert EM: A controlled study of phenomenology and family history in outpatients with bulimia nervosa. *Compr Psychiatry* 1990; 31:275-283
- Kassett JA, Gershon ES, Maxwell ME, Guroff JJ, Kazuba DM, Smith AL, Brandt HA, Jimerson DC: Psychiatric disorders in the first-degree relatives of probands with bulimia nervosa. *Am J Psychiatry* 1989; 146:1468-1471
- Ben-Tovim DI: DSM-III, draft DSM-III-R, and the diagnosis and prevalence of bulimia in Australia. *Am J Psychiatry* 1988; 145:1000-1002