Epidemiology of Bulimia and Symptoms in a General Population: Sex, Age, Race, and Socioeconomic Status

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The prevalence of bulimia (as defined by DSM-III [American Psychiatric Association 1980. Diagnostic and statistical manual of mental disorders *(3rd ed.). Washington, D.C.: Author]) was estimated by structured interview in a random sample of 2,115 adults in the general population, aged 18–96. Prevalence was 1.1% for the total sample, and among women aged 18–30, 4.1%. Bulimic behaviors and symptoms were more common among women than men, younger than older respondents, and, on some items, lower socioeconomic status (SES) than higher SES respondents. There was no difference in prevalence of bulimia between women students and same-aged nonstudents. No racial differences were found. There were more cases of bulimia in the older population than expected.*

Epidemiological information on the prevalence of bulimic behaviors and disorders in the general population is limited because of varying definitions of symptoms and diagnosis, different methods of data collection, and the use of nonrandom and age restricted samples (reviewed in Connors & Johnson, 1987; Fairburn & Beglin, 1990). American definitions usually derive from criteria in the 1980 or the 1987 editions of the *Diagnostic and Statistical Manual of Mental Disorders* of the American Psychiatric Association (respectively, DSM-III bulimia and DSM-III-R bulimia nervosa).

Both DSM-III bulimia and DSM-III-R bulimia nervosa share the features of recurrent episodes of binge eating, fear of being unable to stop, and specific behaviors intended to counteract the effects of binge eating (e.g., rigorous dieting, self-induced vomiting, and use of laxatives or diuretics). Of the two

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studies located that compared cases identified using both definitions, one found a higher prevalence of bulimia than bulimia nervosa (Ben-Tovim, 1988) while the other more thorough study found similar prevalence rates, but only partially overlapping cases (Schotte & Stunkard, 1987).

Most prevalence estimates of bulimia and bulimia nervosa are based on self-report questionnaires, and range from 3–19%. Those based on interview report substantially lower prevalence, from 1–3% (Fairburn & Beglin, 1990), and estimates based on large samples tend to be lower than those using smaller samples. Two population based estimates of bulimia were located. One reported a 2-year prevalence of bulimia in Sweden of .04% in the general population and .47% for 16–24-year-old women (Cullberg & Engstrom-Lindberg, 1988). The other reported a weighted estimate of bulimia among American adolescents of 4.0% for girls and 0.2% for boys (Whitaker et al., 1990); neither study relied exclusively on self-report questionnaires.

The one consistent demographic finding across studies is that bulimia is more prevalent among women than men (Connors & Johnson, 1987; Fairburn & Beglin, 1990). White adolescents and young women appear to have a markedly higher prevalence than their nonwhite counterparts (Fairburn & Beglin, 1990), although some studies find no ethnic or racial differences (e.g., Gross & Rosen, 1988). Subjects in most studies are between 15 and 30 years old, ages where prevalence is believed highest (e.g., Pope, Hudson, & Yurgelun-Todd, 1984). However, bulimia is not limited to young adults; six case reports of recent onset bulimia in women over age 55 were located (Jonas, Pope, Hudson, & Satlin, 1984; Hsu & Zimmer, 1988). The relationship between socioeconomic status (SES) and bulimia is conflicting, with some authors finding a preponderance of eating disorder patients to be middle and upper class women (Fairburn & Cooper, 1984) and others reporting SES distributions that reflect census data for the catchment area (Dolan, Evans, & Lacey, 1989).

This study is the first using a structured interview technique to assess prevalence of bulimia in a representative sample of the general adult population which includes all age groups above 18. Bulimia is defined here using DSM-III criteria since data were collected before DSM-III-R was published.

SAMPLE AND PROCEDURES

This study was included as part of an epidemiological study of alcohol use, problem drinking, and health practices (Rand & Kuldau, 1986). A multistaged probability sample of 2,115 respondents 18 years old or older, residing in Alachua County, Florida, was interviewed once, between May 1984, and October 1985 (Auth & Warheit, 1986). The refusal rate was approximately 20%; age-sex characteristics of respondents and refusals were statistically comparable. Both door-to-door and random digit dialing enumeration (Lucas & Adams, 1977) were used to select households; the Kish (1965) procedure was used to select the specific adult participant within a household. The 1980 census of the county was used to check accuracy of racial, gender, and sociodemographic sampling; persons 60 and older were oversampled because they were the population of primary interest to the principal study. To control for the bias introduced by the oversampling of older adults, we examined prevalence rates of

Table 1. Characteristics of the sample (N = 2,115)

	N (%)
Race/sex	
White males	743 (35.4)
White females	905 (43.1)
Black males	144 (6.9)
Black females	306 (14.6)
Age[a]	
18–24	223 (10.5)
25–34	346 (16.4)
35–44	217 (10.3)
45–54	177 (8.4)
55–64	386 (18.3)
65–74	488 (23.1)
75+	277 (13.1)
Sex	
Males	897 (42.4)
Females	1,218 (57.6)
SES[b]	
I (low)	184 (8.7)
II	314 (14.8)
III	471 (22.3)
IV	633 (29.9)
V (high)	513 (24.3)

[a]Information missing for one subject.
[b]SES derived from a composite of occupation, education, and income following the method suggested by Nam & Powers (1983).

bulimia and symptoms by age group. Adults in prison or hospitalized at the time of the survey were excluded from the survey. Table 1 presents the sociodemographic characteristics of the sample.

There were 25 interviewers; 20 were women, all were white, all were aged 35–50, all were college graduates, and most had a master's degree relevant to the study aims. Interviewers completed 1–3 weeks of training prior to interviewing survey subjects. Interviewers were trained not to score social bingeing positively (in the sense of overeating at holidays, family gatherings, or other ritualized settings that involved heavy eating). The 1.5-hour or more structured interview was usually conducted in the respondent's home. Bulimia items comprised a small portion of the interview.

MEASURES

Bulimia

None of the structured psychiatric interviews available in 1983 contained questions about bulimia (e.g., the D.I.S., S.C.I.D., and the P.S.E.). We, therefore, adapted interview questions used to screen patients in an outpatient clinic. These questions were piloted in a previous study of eating behaviors (Rand & Kuldau, 1986). Behaviors and symptoms (with the exception of weight fluctuations) were considered current if they had occurred within the

Table 2. Bulimia interview questions (and their abbreviations)[a]

1. Have you ever gone on a food binge? That is, consumed large quantities of food in a relatively short period of time (ever binge)?
2. Did you binge on high calorie, easily swallowed foods (high calorie)?
3. Did you feel depressed and/or bad about yourself after bingeing (depressed after)?
4. a. Did you binge rapidly on large quantities of food (rapid eat)?
   b. Did you binge in 2 hours or less (2 hours)?
5. a. Did you binge until your stomach hurt, you felt nauseated, you were interrupted by seeing or hearing someone, you went to sleep, or you vomited (stomach hurt)?
   b. Did you sometimes make yourself vomit after bingeing (vomit)?
6. Did you not want other people to notice or see you during a binge (secretive)?
7. Did you feel your binges were abnormal (abnormal)?
8. Once you started bingeing, were you afraid you would not be able to stop yourself from eating more (unable to stop)?
9. During the last year, did you have weight gains and losses of 10 or more pounds due to bingeing and fasting (weight fluctuations)?
10. Have you ever used laxatives or diuretics to control or lose weight (laxatives/diuretics)?

[a]For scoring purposes, grouped questions were considered to represent only one eating disorder item.

past 2 months (the time frame established by Cooper and Fairburn [1983]) (see Table 2).

Subjects were identified as having bulimia if they affirmed that they had gone on an eating binge and gave positive responses to an additional five or more eating disorder items (including at least one of the following: abnormal, secretive, laxative/diuretics, weight fluctuations, and either stomach hurt or vomit). Respondents 25% under their ideal body weight were defined as being "possible anorexic." The original interviews of all identified cases were examined as a final check on the algorithm by one of the authors (J. K.).

SES

SES scores were based on the method suggested by Nam and Powers (1983). Five SES categories were based on composites of occupation, education, and income scores; see Table 1. Compared with the 1980 U.S. Census data for the entire country, county residents had more education but less income. Most respondents classified as SES I (low) were living at a poverty level while SES V (high) included both middle and upper class respondents.

Data Analyses

Data were analyzed by chi-square, Mann-Whitney-U, analysis of variance (ANOVA), Duncan's Multiple Range Test, and t-test, using the computer program SPSSX.

RESULTS

Prevalence of Bulimia, Symptoms, and Behaviors

In the total sample, 23 subjects (1.1%) met criteria for bulimia. Among women aged 18–30 (n = 242), the prevalence was 4.1%; no cases were identi-

fied among men in this age group. Of the 23 subjects, 21 (91.3%) were women and 10 (43.5%) were women in their twenties. The remaining women ranged in age from 34–77. The men were aged 36 and 61. Weight data were available on 22 of these subjects; none was 25% under ideal weight.

A consistently greater percentage of women than men indicated current presence of each bulimic behavior. Differences in prevalence were statistically significant for the items "ever binge, depressed mood, secretive," and "abnormal" (see Table 3). Note, however, that the majority of both women (91.3%) and men (94.0%) reported *no* bulimic behaviors. There were *no* significant racial differences on individual items (black versus white, black women versus white women, or black men versus white men).

Age and SES

Bulimic behaviors occurred significantly more frequently among younger (18–44 years of age) than older subjects (ages 65+; all $ps < .05$). For example, 5.8% of 18–24 year olds reported weight fluctuations of 10 or more pounds due to bingeing and fasting compared with 2.0% of respondents aged 74–75 and 0.4% of respondents aged 75 or older. *All* bulimic behaviors and symptoms were reported by both younger and older respondents.

The items "depressed mood," "abnormal," and "unable to stop" were significantly less prevalent among respondents in SES IV and V (high) than SES I and II (low; all $ps < .05$). When only women were considered, the additional item "weight fluctuations" was less prevalent among high SES respondents ($p < .05$).

Students

To determine if bulimic behaviors were more common among students than nonstudents, nonstudent subjects were selected whose age was within 1 SD of

Table 3. Prevalence of bulimic behaviors in past 2 months for total sample and by gender

Item	% Yes, in Past 2 Months			
	Total Sample	Men	Women	Statistic Men vs. Women
Ever Binge	8.4	6.4	9.9	$\chi^2 = 8.231$ $p \leq .004$
High calorie	3.1	2.5	3.6	ns
Depressed after	2.1	0.9	3.0	$\chi^2 = 10.834$ $p \leq .001$
Rapid eat	2.0	1.8	2.1	ns
2 hours	3.4	2.6	3.9	ns
Stomach hurts	1.6	1.0	2.0	ns
Secretive	0.9	0.1	1.6	$\chi^2 = 11.622$ $p \leq .001$
Abnormal	1.1	0.6	1.6	$\chi^2 = 4.649$ $p \leq .031$
Unable to stop	0.8	0.4	1.1	ns
Weight fluctuations	4.4	4.2	4.4	ns
Laxatives/diuretics	0.8	0.3	1.1	ns
Vomit	0.3	0.0	0.5	(Not tested)
Bulimia	($n = 23$)	($n = 2$)	($n = 21$)	

Note: ns = not significant.

the mean age of the students. This produced a sample of 160 female and 99 male nonstudents (mean age 25.7 ± 3.2 years). There were 91 female and 129 male students (mean age 24.2 ± 5.8 years).

Significantly more students (19.5%) than nonstudents (12.4%) went on eating binges ($\chi^2_c = 4.579$, 1 *df*, $p \leq .032$). Seven bulimia items were endorsed significantly more frequently by female than male students (items 1–5a, 6, Table 2). A greater percentage of women than men gave a positive response to all of the remaining items, but frequencies were too small to test for significance except for item 9 (percentages of men and women were statistically comparable). There were no significant differences in prevalence of bulimic behaviors between male students and nonstudents.

Criteria for bulimia were met by a statistically comparable number of female students ($n = 5$, 5.5%) and nonstudents ($n = 5$; 3.1%). Five bulimic behaviors were reported significantly more frequently by the female students than nonstudents (items 1–4, Table 2). All of these items except bingeing have been dropped in the DSM-III-R definition, and the definition of bingeing has been considerably tightened.

DISCUSSION

Our study is the only study reporting prevalence of bulimia based on sampling random households in a general population by direct interview. Cullberg and Engstrom-Lindberg (1988) in Sweden, found an unusually low overall prevalence for a total population catchment area by surveying almost all personnel (medical and nonmedical) with responsibility for eating disorder cases. Since most persons with bulimia are not treated (Fairburn & Beglin, 1990; Whitaker et al., 1990), the difference in prevalences between most studies and the Swedish report is attributable to a large extent to sampling methods, plus other factors such as differences in proportions of ages sampled and cultural bias in diagnosis.

The prevalences we found for younger men and women are very close to those reported for a county-wide public secondary school population (Whitaker et al., 1990). This similarity is striking in that Whitaker et al. (1990) is the only other study in which interview methods were applied to a sample of a whole population, even though our sample is age 18 and older while theirs is age 18 and younger.

The clinical significance of the prevalence of 4.1% in women aged 18–30 in our nonclinical sample is somewhat unclear without a more detailed inspection of severity of symptoms and associated psychiatric and physical morbidity (Fairburn & Cooper, 1990). A study by King (1986) included both self-report tests and psychiatric interviews. Subjects were consecutive patients attending four general practices in south London and can, therefore, be considered an approximation of a nonpsychiatric sample of the general population. In this study, the prevalence among 16–35-year-old women was 3.9%, which is very close to the 4.1% in our study. King (1986) found that 1% had symptoms sufficiently severe for outpatient treatment while 2.8% had partial syndromes of bulimia nervosa.

We found *no* racial differences in bulimic behaviors and symptoms. Our survey included too few black students to make meaningful racial comparisons

among students. Other surveys have found fewer bulimic symptoms among black than white female students (e.g., Nevo, 1985; Gray, Ford, & Kelly, 1987). A lower prevalence of bulimic symptoms among black students may be partially attributable to the less restrictive weight standards held by black compared with white women (Rand & Kuldau, 1990). Another study found fewer black than white women referrals to eating disorder clinics (Lacey & Dolan, 1988); it is unknown whether this reflects a lower prevalence of bulimia or the general under-utilization by blacks of referral and counseling services (Sue, 1981; Lawlor & Rand, 1985).

In this survey, the three bulimic behaviors with different prevalence rates in SES all occurred more frequently in SES II (low) than SES V (high). A similar increased prevalence of bulimia among women of lower compared with higher SES was reported for nonstudent community samples in Massachusetts (Pope, Champoux, & Hudson, 1987).

More bulimic behaviors were reported by female students than male students or same-age female nonstudents. This result is compatible with the usual observations of increased binge eating among high school and college women (Connors & Johnson, 1987; Fairburn & Beglin, 1990). The student milieu may heighten conflicts between restrictive weight standards for being attractive and pressures to eat and drink. It is noteworthy that the prevalence of binge vomiting of 2.2% among female students that we found is close to the prevalence of 3.3% among female students reported by Schotte and Stunkard (1987).

Our data emphasize that disturbed eating behaviors appear throughout adult life. Eight of the 23 cases identified were over 45 years old. Physicians and health practitioners should be alert to the possible diagnosis of bulimia nervosa when older adults present with weight loss, weight preoccupation, and/or vomiting.

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