

# Incidence of Laxative Abuse in Community and Bulimic Populations: A Descriptive Review

Daniel M. Neims  
John McNeill  
Thomas R. Giles  
Fredrick Todd

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*Estimates of the incidence of laxative abuse in bulimics and in the community-at-large vary widely for various population samples. This review identifies 73 studies in which laxative abuse could be assessed in bulimics, nonbulimics, and the community-at-large. Relative risk values for laxative abuse among population subsamples were estimated by moment methods statistical procedure based on mixed model analysis. Results indicated that the lifetime occurrence for laxative abuse behavior in the community-at-large was 4.18%. Bulimic behavior increased the risk for laxative abuse 3.57-fold to 14.94%. Several methodologic and population parameter characteristics are examined for their select impact on laxative abuse. Review of medical nomenclature for classifying laxative substances, iatrogenic effects of laxative abuse, and assessment recommendations are also included. © 1995 by John Wiley & Sons, Inc.*

Bulimia is characterized in the *Diagnostic and statistical manual of mental disorders* (3rd rev. ed., American Psychiatric Association [APA], 1987) as a behavior disorder involving recurrent uncontrollable episodes of binge eating, preoccupation with weight or body shape, and instrumental behavior patterns intended to nullify the caloric content of ingested food. Vomiting and laxative use are two primary behavioral responses used for purging purposes. Although both behavior patterns are unadaptive and potentially dangerous forms of weight control, the focus of this paper shall target laxative use only.

## MECHANISMS OF ACTION

Laxative substances are defined as agents used to promote evacuation of the bowel (Vanin & Saylor, 1989). Laxative substances are classified into five groups (see Table 1)

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Daniel M. Neims, Psy.D., is the Clinical Director at Focus Associates, Behavioral Health Resources, Lacey, Washington. John McNeill, Psy.D., is a faculty member at the University of Denver School of Professional Psychology. Thomas R. Giles, Psy.D., is the Executive Director of Associates in Managed Care, Denver, Colorado. Frederick Todd, Ph.D., is a faculty member at the University of Denver School of Professional Psychology. Address reprint requests to Dr. Neims at Focus Associates, 4500 A-Lacey Boulevard SE, Lacey WA 98503-5719.

depending on the specific biologic mechanism and site of action which underly their effect: stimulant or irritant, bulk-forming, osmotic, surfactant, and emollient (Mitchell & Boutacoff, 1986). Stimulant or irritant type agents include diphenylmethanes, anthraquinones, and castor oil (Pietrusko, 1977). These agents are principally derived from botanical glycosides, which affect the alkalinity in the small intestine to promote stimulation of peristalsis within the large intestine. Stimulation of sensory nerve endings in the surface mucosa of the large intestine increases motor function to cause fecal expulsion (Thorn, Adams, Braunschwald, Isselbacher, & Petersdorf, 1977, Hahn, Barkin, & Oestreich, 1982). Bulk-forming agents function to increase the volume of nonabsorbable matter and fluid content promoting distention of the bowel and reflex evacuation. Osmotic agents increase water retention within the intestinal lumen, whereas surfactant and emollient agents promote diffusion of wetting or lubricant properties within the bowel (Thorn et al., 1977; Mitchell & Boutacoff, 1986).

Of these laxative classes, stimulant types appear to be the most commonly abused agents (Wittoesch, Jackman, & McDonald, 1958; Lacey & Gibson, 1985b; Willard, Winstead, Anding, & Dudley, 1989). Moreover, several authors (Sansone, 1984; Mitchell & Boutacoff, 1986) have suggested that stimulant-type laxative agents are preferred by eating disordered patients in particular because these substances facilitate rapid high volume fecal discharge. This effect may inadvertently reinforce the patient's perception that excessive caloric intake has been successfully nullified prior to the intestinal absorption processes taking place (Lacey & Gibson, 1985a; Mitchell, Hatsukami, Pyle, & Eckert, 1986). However, as research indicates, even with extreme laxative-induced purgation, caloric absorption is reduced minimally (approximately 12%; (Bo-Linn, Santa Ana, Morawski, & Fordtran, 1983). Thus, it is likely that weight control occurs more

Table 1. Laxative mechanisms of action, ingredients, and brand examples

Classes	Mechanisms of Action	Active Ingredient	Brand Examples
Bulk	Mechanical distention, increases volume of nonabsorbable intestinal contents, initiates reflex bowel activity	Psyllium Psyllium Psyllium	Metamucil Fiberall Serutan
Osmotic	Retains and increases water	Magnesium salt	Milk of magnesia
Surfactant	Detergent, inhibits water absorption, softens stool	Docusate sodium Suphosuccinate	Colace
Emollients	Inhibits water absorption, lubricates	Mineral oil/phenolphthalein	Agoral
Stimulants	Stimulates myenteric plexus, increases peristalsis	Anthraquinones: Cascara Senna Danthron Bisacodyl	Peri-Colace Senokot Modane Dulcolax
	Stimulates secretion of water and electrolytes	Diphenylmethanes: Phenolphthalein Phenolphthalein Phenolphthalein and dioctyl sodium	Ex-Lax Evac-U-Gen Correctol
	Stimulates secretion of water and electrolytes, increases contractile activity	Ricinoleic acid	Castor oil

Note. from *Pharmacological Basis of Nursing Practice* (p. 103), by J. B. Clark, S. F. Queener, & V. B. Karb, 1987, St. Louis, C.V. Mosby. Copyright 1982 by C.V. Mosby and from "Laxative Products" by R. C. Darlington and C. E. Curry, *Nonprescription Drugs, 5th Edition*, 1977, Washington DC, American Pharmaceutical Association. Copyright 1977 by American Pharmaceutical Association. Adapted by permission.

through overall dietary restraint than by any pharmacologic effects of laxative-induced purgation (Lacey & Gibson, 1985a).

## MEDICAL AND BEHAVIORAL COMORBIDITY

Research on laxative use indicates that the abuse of these agents has high comorbidity with various medical and behavioral disorders (Mitchell, Boutacoff, Hatsukami, Pyle, & Eckert, 1986; Mitchell & Boutacoff, 1986). Medical complications stemming from laxative ingestion depend on the severity of abuse, including the frequency, duration, and type of agents used. In general, negative medical effects fall into two broad areas (Mitchell, Hatsukami, Pyle, & Eckert, 1986): Those problems confined to gastrointestinal tract dysfunctions (e.g., colonic mucosa inflammation and ulceration, ileocecal sphincter dilation, colonic neuropathy, steatorrhea, protein-losing gastroenteropathy; Cummings, 1974; Cummings, Sladen, James, Sarner, & Miesiewicz, 1974; Larusso & McGill, 1975; Cooke, 1977; Kim, Gerle, & Rozanski, 1978; Sansone, 1984; Cuellar & VanTheil, 1986; Mitchell, Seim, Colon, & Pomeroy, 1987) and/or problems of a more systemic nature (e.g., anemia, pancreatic dysfunction, electrolyte imbalance laxative tolerance side effects; Cummings et al., 1974; Swift, 1979; Hahn et al., 1982; Mitchell & Boutacoff, 1986; Brotman, Rigotti, & Herzog, 1985; Lacey & Gibson, 1985a; Willard et al., 1989). Prolonged laxative abuse is also associated with chronic kidney disease (Straffuth & Allot, 1962) and cardiovascular disorders (Comeric, 1986). Furthermore, the progressive laxative dosing observed in some laxative users may be attributed to hypofunctioning in bowel processes, loss of intrinsic innervation action, and laxative tolerance effects (Cummings et al., 1974; Giles, 1993).

Laxative abuse may be especially dangerous for persons with inflammatory disorders of the alimentary tract (e.g., appendicitis, typhoid fever, ulcerative colitis; Thorn et al., 1977) or persons with chronic anemia, hemophilia, or constipation disorders. Some types of stimulant agents (e.g., anthraquinone-based substances) have shown to have laxative effects on infants through the breast milk of nursing women.

Behavioral comorbidity found in laxative-abusing persons may include affective disorders (Hatsukami, Mitchell, Eckert, & Pyle, 1984; Mitchell, Hatsukami, Pyle, & Eckert, 1986a; Vanin, & Saylor, 1989), substance abuse (Hatsukami et al., 1986; Mitchell, Boutacoff, Hatsukami, Pyle, & Eckert, 1985; Jonas, Gold, Sweeney, & Pottash, 1987), self-destructive behaviors (Mitchell et al., 1986), collateral purge methods (Mitchell, Boutacoff, Hatsukami, Pyle, & Eckert, 1985), and general life impairments (Johnson & Love, 1985).

## PREVALENCE

Laxative use and its abuse among eating disordered and non-eating disordered persons have become the subject of increasing empirical scrutiny (Kagan & Squires, 1984a; Mitchell & Boutacoff, 1986; Willard et al., 1989; Waller, Newton, Hardy, & Svetlik, 1990). Although research suggests that the estimates of the incidence of laxative use and abuse in bulimic and community populations vary widely, no systemic compilation of the available studies has been undertaken to date. Thus, the purpose of this article is to provide a comprehensive review of the research on the prevalence and relative risk of laxative abuse across various populations. The research question was as follows: What

are the estimated relative risk values and prevalence rates for laxative abuse given bulimic, nonbulimic, and community population subgroups?

## METHOD

Studies gathered for this descriptive review were obtained from three primary sources: (1) Psych Abstracts, (2) PsychLit and Medline databases, and (3) reference citations. The medical and behavioral literature on bulimic behavior and laxative abuse yielded 157 studies. A number of studies were excluded from the final data analysis due to various methodologic problems: (a) missing data on laxative abuse ( $N = 42$ ), (b) confounds of laxative abuse with other dependent measures ( $N = 21$ ), (c) nonspecified diagnostic criteria ( $N = 7$ ), and (d) data sets that could not be reduced to binary present-absent categorization. Also excluded were studies in which comorbidity existed with anorexia nervosa.

Problems involving the nonstandardization of measurement formats employed across studies prevented use of a direct cross-study analytic comparison using traditional parametric statistical methods. A solution to this problem therefore necessitated use of a classification scheme based on a dichotomous measurement system (laxative abuse presence or absence). Thus, of the original 157 articles surveyed, only 73 were found to be suitable for inclusion into this descriptive review.

### Statistical Procedure

The moment methods estimation procedure (Moore, 1986; Moore & Tsiatis, 1991) was selected for statistical analysis purposes. The methodology is expressly adapted for data sets involving extra-binomial variation problems (e.g., asymptotic variation, misspecified variance estimates, small sample size) when only the form of the mean and variance are specified within a reviewed study. Extra-binomial variation is modelled using an iterated weighted least squares method (beta distribution) and provides variance correction to yield consistent parameter estimates when cluster randomization effects are present among comparative data sets. Tables 2, 3, and 4 summarize studies of laxative abuse among community, bulimic, and nonbulimic subgroups, respectively.

The following independent factors were examined using the moment methods estimation procedure: assessment methodology used for data collection purposes, diagnostic criteria used to specify the presence or absence of bulimic behavior, criteria used to specify presence or absence of laxative abuse, respondent rate, and sample size variables.

## RESULTS

Preliminary data analysis indicated negligible statistical differences across studies for estimates of laxative abuse prevalence based on respondent rate or sample size characteristics. These findings thus justify the inclusion of small sample size studies within this descriptive review.

Table 2. Community studies of laxative abuse

Citation	N	R (%)	Total Use		Sample Description	Assessment Method	Laxative Abuse Criteria	
			n <sub>a</sub>	n <sub>b</sub> %				
Halmi, Falk, & Schwartz (1981)	639	66	46	(2)	4.8	College students	Questionnaire	Method of weight control
Clark & Palmer (1983)	415	66.5	156	(20)	12.8	U.K. college students	Questionnaire	Method of weight control
Cooper, Waterman, & Fairburn (1984)	385	96.1	364	(18)	4.9	Female family planning clinic	Questionnaire, self-report	Method of weight control within the last 2 months
Fairburn & Cooper (1984)	43	93.4	35	(11)	31.4	Full sample General practice and referred women patients	Interview, questionnaire, self-report	Method of weight control
Kagan & Squires (1984b)	2,004	—	2,004	(63)	2.0	Highschool adolescent sample	Interview, questionnaire	Laxative use before and/or after eating
Crowther, Post, & Zaynor (1985)	363	48.0	166	(17)	10	Highschool students: female	Interview	Purging behavior
Gray & Ford (1985)	630	53.8	260	(7)	3.0	College students	Questionnaire	Weight loss method
Touyz & Ivison (1985)	678	44.6	303	(51)	7.6	Australian college students	Questionnaire	Purging behavior > or = 1X/wk
Hendren, Barber, & Sigatous (1986)	592	—	592	(13)	2.3	Highschool students: female	Questionnaire	Method of weight control
Herzog, Norman, Rigotti, & PePOSE (1986)	212	57.1	121	(4)	3.4	Medical students: female	Questionnaire, self-report	Laxative use = daily or > daily
Killen et al. (1986)	1,728	—	1,728	(108)	6.2	10th-grade students	Questionnaire	Form of purging behavior
Williams, Schaefer, Shissiak, Gronwaldt, & Commeric (1986)	72	84.7	1	(1)	1.0	Highschool students: female	Questionnaire	Weight control method
Zuckerman, Colby, Ware, & Lazerson (1986)	907	75	907	(54)	6.0	College freshman and seniors	Questionnaire	Method of current weight control
Shefer (1987)	321	91.7	321	(30)	9.4	South African college students: female	Questionnaire, self-report	Means of weight control

Table 2. Continued

Citation	N	R (%)	Total Use		Sample Description	Assessment Method	Laxative Abuse Criteria	
			$n_a$	$n_b$ %				
Lachenmeyer, Muni-Brander, & Belford (1988)	549	—	549	(37)	6.7	High SES highschool students	Questionnaire	Method of weight control
	1,261	—	1,261	(144)	11.4	Highschool students	Questionnaire	Method of weight control
	712	—	712	(107)	15.0	Low/middle SES highschool students	Questionnaire	Method of weight control
Mintz & Betz (1988)	682	94.2	578	(9)	1.5	College introductory psychology class: female	Questionnaire	Method of weight control
Rosen et al. (1988)	85	89.4	85	(5)	6.0	Chippewa Indian community: female	Questionnaire	Purging method
Ben-Tovim, Subbiah, & Scheutz (1989)	31	—	31	(7)	22.6	Dietetic patients: female	Questionnaire	Behaviors to counteract weight gain
	234	94	220	(23)	10.9	General medical practice	Questionnaire	Behaviors to counteract weight gain
	1,069	74	793	(13)	3.9	Highschool students	Questionnaire	Behaviors to counteract weight gain
Johnson, Tobin, & Lipkin (1989)	1,268	98.1	1,261	(91)	7.3	Highschool students: female (1981 sample)	Questionnaire, self-report	Purging behavior > or = 1x/wk
	1,085	96	1,075	(60)	5.8	Highschool students: female (1986 sample)	Questionnaire, self-report	Purging behavior > or = 1x/wk
Ferrero & Rouget (1991)	11,800	35.5	3,091	(46)	1.5	Swiss college students	Questionnaire	Method of current weight control
Mitchell, Pyle, & Fletcher (1991)	1,261	—	1,261	(47)	3.7	Community	Questionnaire	Method of weight control

Note. N = total sample; R = respondent rate (%);  $n_a$  = subsample;  $n_b$  = total abusers. SES = socioeconomic status.

Table 3. Nonbulimic community studies of laxative abuse

Citation	N	R (%)	Total Use		Sample Description	Assessment Method	Laxative Abuse Criteria
			$n_a$	$n_b$ %			
Cooper, Waterman, & Fairburn (1984)	385	96.1	297	(7) 2.4	Not diagnosed with an eating disorder	Questionnaire, self-report	Method of weight control within the last 2 months
Pyle, Neuman, Halvorson, & Mitchell (1991)	1,836	97.2	852	(17) 1.9	Nonbulimic community control sample (1986)	Questionnaire	Current use

Note. N = total sample; R = respondent rate (%);  $n_a$  = subsample;  $n_b$  = total abusers.

Table 4. Bulimic studies of laxative abuse

Citation	N	R (%)	n <sub>a</sub>	n <sub>b</sub>	Total Use		Sample Description	Assessment Method	Bulimic Criteria	Laxative Abuse Criteria
					%					
Pyle, Mitchell, & Eckert (1981)		100	34	(18)	52.9		Female bulimic outpatient	Intake data, questionnaire, interview	DSM-III	Laxatives to rid ingested food
Abrahams & Beaumont (1982)	32	100	32	(24)	75		Eating disordered outpatients	Interview	Uncontrollable repetition of ravenous eating	Purgation as weight loss method
Johnson, Stuckey, Lewis, & Schwartz (1982)	454	68	316	(199)	63.0		Community bulimics; Female	Postal questionnaire	DSM-III	Purging behavior
Mitchell, Pyle, Eckert, Pomeroy, & Hatsukami (1988)	168	—	168	(64)	38.1		Bulimic outpatient	Dx interview, questionnaire	DSM-III; and atypical eating disorders	Method of weight control
Fairburn and Cooper (1983)	35	—	35	(11)	31.4		Patient series	Questionnaire	DSM-III	Method of weight control
Cooper, Waterman, & Fairburn (1984)	384	96.1	76	(11)	14.5		Diagnosed eating disorder	Questionnaire, self-report	Abnormal eating habits	Method of weight control within last 2 months
Fairburn & Cooper (1984)	620	83.6	499	(93)	18.8		Community bulimics; Female	Questionnaire	Russel (1979) with vomiting present	Abuse of purgatives
Fairburn & Cooper (1984b)	1346	76.1	145	(61)	42.3		Community bulimics; Female	Questionnaire	Russel (1979) and modified DSM-III	Method of weight control
Crowther, Post, & Zaynor (1985)	363	—	17	(1)	5.8		Bulimic highschool students; Female	Questionnaire	DSM-III	Purging behavior
Gray & Ford (1985)	630	53.8	32	(9)	28		Bulimic college students; Female	Questionnaire	DSM-III	Weight loss method



Huon (1985)	140	85.7	120	(35)	29.2	Community bulimics: Female	Postal questionnaire	DSM-III; binge/purge >1x/wk	Weight reducing activity
Johnson & Flach (1985)	191	—	105	(55)	53.0	Bulimic outpatients	Questionnaire, self-report	DSM-III	Laxative use = or >1x/wk
Johnson & Love (1985)	800	68	288	(53)	18.7	Community bulimics: Female	Questionnaire, self-report	Difficulty with binge eating in last 6 months	Purging behavior at least weekly
Lacey & Gibson (1985a)	30	100	30	(9)	30.0	Bulimic outpatient: Female	Interview, self-report, physiological measures	DSM-III, Russel (1979)	Laxative use >1x/day
Mitchell, Hatsukami, Eckert, & Pyle (1985)	275	97.8	269	(163)	60.6	Bulimic patients	Questionnaire, interview,	vomit/purge >1x/day; weight control method > dietary restraint	Method of weight control
Yates & Sambraillo (1985)	31	66.6	24	(6)	25	Community bulimics: Female	Questionnaire, self-report	DSM-III modified	Purging method
Hatsukami, Mitchell, Eckert, & Pyle (1986)	46	—	46	(24)	52.2	Bulimic female patients	Questionnaire, retrospective data	DSM-III	Eating disorder behaviors
		—	34	(24)	70.6	Bulimic female patients with substance abuse disorder Dx	Questionnaire, retrospective data	DSM-III	Eating disorder behaviors
		—	34	(17)	50.0	Bulimic female patients with affective disorder Dx	Questionnaire, retrospective data	DSM-III	Eating disorder behaviors
Mitchell, Boutacoff, Hatsukami, Pyle, & Eckert (1986)	185	—	84	(37)	45.4	Bulimic outpatients: Females, purgation, and laxative use	Self-report, client data base	DSM-III; lax >1x/wk; 18 or older	Weight loss method; laxative use >1x/wk
		—	14	(2)	16.7	Bulimic outpatient: Female, laxative abusers only	Self-report, client data base	DSM-III; lax >1x/wk; 18 or older	Weight loss method; laxative use >1x/wk

Table 4. Continued

Citation	N	R (%)	n <sub>a</sub>	n <sub>b</sub>	Total Use		Sample Description	Assessment Method	Bulimic Criteria	Laxative Abuse Criteria
					%	(#)				
Mitchell, Davis, Goff, & Pyle (1986)	75	90.4	75	(28)	37.3		Bulimic outpatients pretreatment	Questionnaire, interview, FU phone	DSM-III modified; binge and vomiting or laxative abuse more than 1x/wk	Laxative > 1x/wk
Mitchell & Goff (1984)	12	100	12	(1)	8.3		Bulimic patients: Male	Interview, intake data, demographics	DSM-III	Method of weight control
Pyle, Halvorson, Neuman, & Mitchell (1986)	1,389	95.9	54	(17)	31.4		Bulimic college students: Female	Questionnaire	DSM-III	Method of current weight control, current and ever
		—	45	(10)	22.2		Bulimic college students: Female	Questionnaire	DSM-III	Method of current weight control
		—	54	(6)	11.1		Bulimic college students: Female	Questionnaire	DSM-III	Method of weight control, maximum use ever
Robinson & Holden (1986)	9	100	9	(4)	44.4		Bulimic outpatient: Male	Clinical data base, demographics	Modified Russel (1979)	Unspecified
Jonas, Gold, Sweeney, & Pottash (1987)	259	—	259	(21)	8.4		Cocaine hotline respondents	Structured phone interview	DSM-III	Method of weight control
		—	57	(6)	10.5		Cocaine hotline respondents meeting bulimic criteria	Structured phone interview	DSM-III	Method of weight control
	—	52	(4)	8.0			Cocaine hotline respondents meeting bulimic criteria without purging	Structured phone interview	DSM-III	Method of weight control

	—	24	(5)	20.8	Cocaine hotline respondents meeting bulimic criteria with purging	Cocaine hotline respondents bulimics	Structured phone interview	DSM-III	Method of weight control
Yager, Landsverk, & Edelstein (1987)	—	177	(7)	3.9	Cocaine hotline respondents	Community bulimics	Structured phone interview Postal questionnaires	DSM-III DSM-III & Sx severity estimate	Method of weight control Severity scale of BBS
	628	392	(7)	1.9					
			(4)	1.1	Community bulimics	Community bulimics	Postal questionnaires	DSM-III & Sx severity estimate	Severity scale of BBS
Drenowski, Hopkins, & Kessler (1988)	1,007	81	(6)	7.4	Bulimic college students: Female		Structured phone survey	DSM-III-R; dieting at time, desire for weight loss	Laxative use as bulimic behavior
Mitchell, Pomeroy, Seppala, & Hubber (1988a)	15	15	(9)	44.4	Diuretic abusers and symptomatic volunteers with affective disorders	Diuretic abusers and symptomatic volunteers with bulimic diagnoses and symptomatic volunteers	Questionnaire, interview	DSM-III-R	Method of weight control; current
			(5)	80.0	Diuretic abusers and symptomatic volunteers with bulimic diagnoses and symptomatic volunteers	Diuretic abusers and symptomatic volunteers	Questionnaire, interview	DSM-III-R	Method of weight control; current
			(4)	28.5	Diuretic abusers and symptomatic volunteers	Diuretic abusers and symptomatic volunteers	Questionnaire, interview	DSM-III-R	Method of weight control; current
Ben-Tovim, Subblah, & Scheutz (1989)	27	27	(17)	63.0	Bulimic outpatients	Bulimic outpatients	Questionnaire	DSM-III/DSM-III-R	Behavior to counteract weight gain
Woell, Fichter, Pirke & Wolfram (1989)	30	30	(6)	20.0	Bulimic patients: Female	Bulimic patients: Female	Self-report	Binge eating and pathological methods for weight control DSM-III-R	Pathological methods for weight control
Yates, Sielami, & Bowers (1989)	30	16	(1)	5.1	Female normal weight bulimic	Female normal weight bulimic	Interview, questionnaire	DSM-III-R	Unspecified
	30	14	(1)	4.3	Female normal weight bulimic	Female normal weight bulimic	Interview, questionnaire	DSM-III-R	Unspecified

Table 4. Continued

Citation	N	R (%)	n <sub>a</sub>	Total Use		Sample Description	Assessment Method	Bulimic Criteria	Laxative Abuse Criteria
				n <sub>b</sub>	%				
Waller, Newton, Hardy, & Svetlik (1990)	70	95.2	70	(21)	30.0	Bulimic outpatient: Female	Interview, self-report	DSM-III; vomiting >1x/wk	1x/wk or more of 2x recommended dosage
Pyle, Neuman, Halvorson, & Mitchell (1991)	1836	—	54	(9)	15.3	Bulimic college students: Freshman (1983)	Questionnaire	DSM-III-R operationalized	Current use
		—	59	(6)	11.5	Bulimic college students: Freshman (1986)	Questionnaire	DSM-III-R operationalized	Current use

Note. N = total sample; R = respondent rate (%); n = subsample; n = total abusers. FU = follow up; BBS = binge behavior scale.

### Diagnostic and Assessment Method Factors

Measurements on estimates of laxative abuse were impacted by the various definitional criteria used to diagnose laxative abuse. Less stringent definitional criteria (e.g., "use of laxative for weight regulation") yielded lower estimates of laxative abuse than did definitional criteria based on more objective statements (e.g., "laxative use greater than one occasion per week"). Similar findings were observed for bulimia definitional criteria. Thus lower estimates of laxative abuse were obtained across studies when less stringent versus more stringent diagnostic criteria were employed (DSM-III-R criteria = 16.60% [APA, 1980]; DSM-III criteria = 21.04%; specification of maladaptive eating patterns = 28.22%).

Estimates of laxative abuse were also impacted by the type of assessment methodology used (see Table 5). Estimates ranged from 19.83% to 40.72% across bulimic groups when questionnaire measures were used alone or in combination with other methods. The inclusion of more structured interview formats yielded a smaller range of estimated rates of laxative abuse (21.92% to 26.73%).

### Relative Risk Values

The relative risk that bulimia contributes to a person's abuse of laxatives may be computed by dividing the rate of laxative abuse per subgroup of interest by the rate of comparative use as demonstrated in the cohort community subgroup. A calculation based on all studies combined yielded an estimated relative risk ratio of 3.57. The estimated relative risk of abusing laxatives during college years when bulimic was 4.38. The estimated relative risk for community subgroup when bulimic was 2.61.

Results of group and subgroup comparisons are shown in Table 6. Significant differences in laxative abuse rates were found for comparisons involving combined community (4.18%) and combined bulimic groups (14.94%). Data indicated that the rate of laxative abuse varied by subgroup within both community (high school = 4.88%; college = 3.03%; combined community studies = 2.71%) and bulimic groups (high school = data unavailable; college = 14.46%; combined community studies = 7.29%). The highest rates of laxative abuse in the combined community group were found for those persons under medical care without a primary diagnosis of bulimia (5.72), whereas the

Table 5. Summary of mean moment methods: Presence of laxative abuse by assessment methodology

Assessment Methodology	Estimate of Mean Laxative Abuse (%) <i>p</i>	Standard Error (%)
Community		
Self-report and questionnaire	4.60	7.1
Questionnaire	3.85	4.3
Bulimic		
Self-report and questionnaire	40.72	6.8
Interview and questionnaire	21.92	9.1
Phone interview	69.66	1.4
Questionnaire	19.83	4.3
Postal questionnaire	39.67	6.3
Intake, interview, and questionnaire	26.73	9.2

combined bulimic group revealed the highest laxative abuse rates for those patients with a primary diagnosis of bulimia (27.21%).

## DISCUSSION

Many difficulties were encountered in the conduct of this review due to the extreme diversity in research methods that characterize investigation into this area. In many instances, studies were plagued by the use of nonstandardized diagnostic criteria for the specification of laxative abuse and bulimic behaviors and by the use of nonquantitative assessment methods for specification of basic metric parameters (e.g., onset, duration, frequency, magnitude). Of the 157 studies accessed from the medical and behavioral literature on laxative abuse and bulimia, only 73 were found in which estimates of the incidence of laxative abuse could be compared across populations. Comparisons of laxative abuse and bulimic prevalence rates across bulimic, nonbulimic, and community groups were ultimately achieved through use of the moments method approach to statistical analysis.

The influence of several potential confounding variables were initially examined. Results indicated that the prevalence of laxative abuse was not significantly impacted by such factors as respondent rate or sample size characteristics. However, variables associated with diagnostic classification criteria and data collection methods were found to impact prevalence rate estimates. For example, studies that employed more objective or stringent laxative abuse and bulimic definitional criteria yielded lower overall prevalence estimates for laxative abuse. This finding may reflect the existence of subgroups of eating disordered patients who are not diagnosed as bulimic utilizing DSM-III-R criteria, but utilize laxatives for weight control purposes.

Prevalence estimates of laxative abuse also varied considerably depending on the type of data collection methods used for assessment purposes. Incidence rates ranged from 19.83% to 40.72%. Structured interviews alone or in combination with questionnaires resulted in a lower and narrower estimate range (21.92% to 26.73%), a result that may be indicative of a general reticence to report laxative abuse to interviewers.

Statistical analysis yielded significant differences in the prevalence of laxative abuse among bulimic, nonbulimic, and community groups and subgroups. The lifelong incidence of laxative abuse in community samples was estimated at 4.18%. Subgroups ranged between 2.71% to 5.72% with the highest rate found for those community mem-

Table 6. Summary of mean moment methods: Presence of laxative abuse by group

Group	Estimate of Mean Laxative Abuse in Percent		
	Community	Bulimic	Significance
Total	4.18 (2.5)	14.94 (2.5)	.0001
High school	4.88 (1.0)	0	
College	3.30 (3.3)	14.46 (3.1)	.001
Community unsp.	2.71 (3.4)	7.29 (3.4)	.05
Patients without primary bulimic diagnosis	5.72 (10.1)	—	—
Patients with primary bulimic diagnosis	27.21 (5.7)	—	—

Note. 0 = Insufficient number of studies disallowed moment method analysis, parenthesis = standard error of estimated mean in percent. Measures of significance are two-tailed.

bers under medical care but without bulimia. The incidence of laxative abuse in the combined bulimic samples was estimated at 14.94%. Subgroups ranged between 7.29% to 27.21% with highest rates found for those persons having a primary diagnosis of bulimia. Bulimic behavior increased the overall relative risk of laxative abuse by 3.57-fold.

Although the exact relationship between bulimia and laxative abuse remains unknown, several speculative hypotheses may be suggested. First is the general, albeit incorrect, belief that laxative use will counteract caloric absorption through the intestines. Second, may be the physiologic correlates of laxative abuse, such as the lessening of a subjective sense of bloatedness and fullness. Third, a notable number of laxative abusers across studies report that ongoing laxative utilization reduces gastrointestinal cramping and constriction.

The findings of this review suggest fertile areas for future research should include the examination of bulimia and laxative abuse during adolescence, longitudinal case controlled studies of the course of laxative abuse, and exploration of the high incidence of laxative abuse among patients under treatment for medical and behavioral disorders other than bulimia. Very few definitive studies of the behavioral treatment of laxative abuse were found, especially when it appears associated with bulimia. Such studies with a focus on efficacy and cost-effectiveness are needed.

In conclusion, this study found that the incidence of laxative abuse in bulimics and in the community-at-large varies widely for various population subgroups. Relative risk values for laxative abuse suggest a nonbulimic laxative-abusing subsample that appears to be more frequent in persons under medical treatment for disorders other than bulimia. Relative risk for laxative abuse when bulimic was significantly higher than for other groups and was notably elevated for those studies that sampled inpatient and outpatient populations.

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