

Weight Concerns, Problem Eating Behaviors, and Problem Drinking Behaviors in Female Collegiate Athletes

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Objective: To compare eating behaviors and alcohol drinking habits between 2 groups of female college students: varsity athletes and controls (nonathletes).

Design and Setting: We obtained descriptive data using an anonymous, self-report survey instrument. The instrument assessed eating habits and behaviors as well as alcohol consumption and drinking behaviors.

Subjects: One hundred forty-nine female varsity athletes and 209 female controls (nonathletes) from 2 National Collegiate Athletic Association Division I universities.

Measurements: Data collected included weight and desired weight, meal patterns, methods of gaining or losing weight, details of past or current eating problem, 2-week alcohol consumption quantity and frequency (binge drinking), and problem alcohol behaviors. We used chi-square analysis for nominal

data and *t* tests and multivariate analysis of variance for interval data.

Results: Compared with athletes, nonathletes ate fewer meals, and more of them reported feeling that they were too heavy and lied about their weight-control practices. Neither group reported high rates of pathologic behaviors such as vomiting. Nearly 18% of athletes and 26% of controls reported a past or current eating disorder. Athletes did not differ from controls in reported 2-week alcohol consumption, including binge drinking (nearly 50% of both groups).

Conclusions: Self-reported problem drinking and eating behaviors exist in both athletes and controls but not at different rates. This finding may be a result of coach, athletic trainer, and peer-group counseling at these 2 schools or a general trend for lower rates of unhealthy behaviors among female athletes.

Key Words: eating disorders, alcohol use, varsity athletes

The collegiate athletic trainer is in a key position to identify and help female varsity athletes with unhealthy eating and alcohol drinking habits because he or she spends considerable time with them. Individuals with eating disorders exist in all female populations,¹ including athletes.²⁻⁵ Johnson et al⁶ found that approximately 10% of National Collegiate Athletic Association (NCAA) female athletes had clinically significant problems with either bulimia or binge eating and that 1.1% of female athletes met the *Diagnostic and Statistical Manual of Mental Disorders DSM-IV*⁷ criteria for bulimia nervosa (no control group was studied). It has been reported that not only disordered eating³ but also problem drinking⁸ is more common among female athletes than among their nonathlete counterparts. However, the NCAA research staff noted a declining rate of reported use of alcohol from 1985 to 1997 among both male and female athletes (no control group was studied).⁹ Evidence also indicates that women with an eating disorder, especially bulimia nervosa, are at increased

risk for alcohol and other drug abuse.¹⁰⁻¹³ This relationship remains underinvestigated in female athletes. The relationship between disordered eating and alcoholism extends in a continuous, graded manner to subthreshold levels of dieting and alcohol-use behaviors.¹⁴ When attempting to understand either eating behaviors or alcohol-use patterns, athletic trainers must distinguish subclinical activities (eg, disordered eating, unhealthy eating patterns, occasional binge drinking) from clinical diagnoses (eg, bulimia, anorexia, alcoholism).

Data examining the relationship between eating disorders and alcohol abuse in female athletes do not exist. Therefore, we surveyed female athletes and nonathletes enrolled in 2 Division I-A universities in order to describe the prevalence of self-reported eating disorders and alcohol use and to investigate the relationship between disordered eating and alcohol use in NCAA female athletes at these 2 schools. We hypothesized that varsity athletes would report more disordered eating behaviors and weight concerns than the control population; that athletes would report more problem drinking behaviors than the control population; and that female students reporting binge eating or bulimia would be more likely to report binge drinking.

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METHODS

Sample

We distributed the study survey during the academic years of 1997–1998 and 1998–1999. We obtained survey responses from 149 (55% of 273) female varsity athletes at the 2 schools. Varsity teams surveyed included the basketball, cross-country and track, lacrosse, rowing, soccer, softball, swimming and diving, tennis, and volleyball teams. We received completed surveys from 209 nonathlete undergraduate female students (control subjects). The control population was a convenience sample from both undergraduate academic classes and students presenting for routine examinations at a student health facility. One of the schools had a population of 10 455 female undergraduates, and the other had 6857 female undergraduates. The ethnic composition of the athletes was African American, 5.4%; Asian American, 2.7%; Caucasian, 87.1%; Hispanic American, 2.0%; Native American, 0.0%; other, 2.7%. The ethnic composition of the controls was African American, 11%; Asian American, 2.9%; Caucasian, 81.3%; Hispanic American, 1.4%; Native American, 1.4%; other, 1.9%. No significant difference was noted in the ethnic composition of the groups.

Measures

The anonymous questionnaire asked for basic demographic information such as age, ethnic group, year in school, athlete status (versus nonathlete), sorority membership (school 2), height, weight, and ideal weight. To protect anonymity, we did not ask for the athlete's specific varsity sport. We also asked about eating patterns, weight control, and past or current eating disorders. We asked about problem drinking behaviors, including questions from a previously validated alcoholism screening test (Short Michigan Alcoholism Screening Test [SMAST]).¹⁵ We asked whether the subject herself or her friends or teammates lied about the subject's eating or drinking practices. We also asked each subject to report her 2-week alcohol-consumption frequency and quantity. We defined 1 drink as a 12-oz (354.88-mL) beer, a 4-oz (118.29-mL) glass of wine, or a 1.5-oz (44.36-mL) shot of liquor. The questionnaire was returned in a sealed envelope to one of the investigators to ensure confidentiality and enhance the response rate. At no time did an individual coach see a subject's response.

Procedures

The survey and study were approved by the appropriate human subjects research committees. Accompanying the survey was a cover letter stating that participation was completely voluntary and that return of the anonymous questionnaire constituted consent to participate.

Analyses

We defined binge drinking as 4 or more drinks on one occasion at least once during the 2-week period.¹⁶ The total number of drinks consumed during the 2-week period was estimated on the basis of the number of drinks reported per occasion and the number of occasions of drinking during this time. The answers to the SMAST were scored unweighted, and a total score was computed (a score of ≥ 3 reflecting problem drinking behavior).¹⁵

Table 1. Past and Current Weight-Loss Methods Reported by Female College Athletes and Controls

	Athletes, n (%)	Controls, n (%)	P Value*
Past use			
Limit portions	81 (54.4)	154 (73.7)	.00015
Skip snacks/desserts	91 (61.1)	158 (75.6)	.00324
Skip meals	44 (29.5)	112 (53.6)	.00001
Increased exercise	99 (66.4)	173 (82.8)	.00036
Over-the-counter diet aids	19 (12.8)	54 (25.8)	.00245
Prescription weight-loss aids	4 (2.7)	7 (3.3)	.71942
Vomit after eating	9 (6.0)	21 (10.0)	.17736
Laxatives after eating	4 (2.7)	12 (5.7)	.16763
None	33 (22.1)	19 (9.1)	.00055
Current use			
Limit portions	57 (38.3)	111 (53.1)	.00550
Skip snacks/desserts	64 (43.0)	105 (50.2)	.17344
Skip meals	21 (14.1)	44 (21.1)	.09226
Increased exercise	60 (40.3)	132 (63.2)	.00002
Over-the-counter diet aids	4 (2.7)	13 (6.2)	.12103
Prescription weight-loss aids	0 (0)	2 (1.0)	.23114
Vomit after eating	1 (0.7)	4 (1.9)	.08947
Laxatives after eating	0 (0)	4 (1.9)	.08947
None	57 (38.3)	44 (21.1)	.00036

*P value indicates between-groups comparison.

We performed frequency counts and chi-square analyses using cross-tabulation for nominal data. We calculated *t* tests to compare means and multivariate analysis of variance to compare alcohol consumption between the groups (athletes versus controls stratified by regret). We used stepwise multiple regression analysis to determine predictors of total alcohol consumption. We used the Statistical Package for the Social Sciences for UNIX (version 6.1, SPSS Inc, Chicago, IL). An alpha level of .05 was chosen for statistical significance.

RESULTS

The mean age of all women was 20.2 ± 2.4 years, with athletes being 1 year younger than the control population (19.6 ± 1.2 years versus 20.6 ± 2.0 years, $t_{356} = 4.25$, $P < .001$). Athletes were taller than controls (1.70 ± 0.08 m versus 1.67 ± 0.07 m, $t_{356} = 3.86$, $P < .001$), but there were no differences in mean mass (63.4 ± 8.1 kg versus 62.6 ± 10.0 kg, $t_{356} = .88$, $P = .38$) or body mass index (21.8 ± 2.1 kg/m² versus 22.3 ± 3.3 kg/m², $t_{356} = 1.74$, $P = .08$). Athletes and controls considered their ideal weight to be less than their current weight. However, the difference between current and ideal weight was greater among the controls than among the athletes (5.2 ± 5.4 kg versus 2.3 ± 3.6 kg, $t_{356} = 6.01$, $P < .001$).

Eating Habits and Behaviors

Compared with athletes, the controls ate fewer meals per week (13.6 ± 4.9 versus 16.4 ± 5.4 , $t_{356} = -4.26$, $P < .001$) but reported more fast-food meals per week (1.5 ± 1.7 versus 1.0 ± 1.5 , $t_{356} = 2.59$, $P < .05$). More nonathlete controls than athletes reported that they were too heavy (45.9% versus 26.8%, $\chi^2_1 = 16.75$, $P < .001$), lied about their weight-control practices (25.5% versus 10.7%, $\chi^2_1 = 12.10$, $P < .001$), and felt guilty about such practices (32.5% versus 17.4%, $\chi^2_1 = 10.22$, $P < .01$). The controls reported more past and current

Table 2. Self-Reported Eating Disorders in Female College Athletes and Controls

	Athletes, n (%)	Controls, n (%)	χ^2_1	P Value*
I consider myself a normal eater	127 (85.2)	165 (78.9)	2.29	.13047
I am a binge eater	17 (11.4)	26 (12.4)	0.09	.76744
I have a history of binge eating but do not have the problem now	4 (2.7)	14 (6.7)	2.94	.08667
I have bulimia	1 (0.7)	2 (1.0)	0.09	.76997
I have a history of bulimia but do not have bulimia now	6 (4.0)	14 (6.7)	1.18	.27793
I have anorexia	1 (0.7)	2 (1.0)	0.09	.76997
I have a history of anorexia but do not have anorexia now	4 (2.7)	14 (6.7)	2.94	.08667
One or more eating disorders (past or current)	26 (17.5)	54 (25.8)	3.53	.06039

*P value indicates between-groups comparison.

weight-loss methods, such as increasing exercise (63.2% versus 40.3%, $\chi^2_1 = 18.33$, $P < .001$) and limiting portion size (53.1% versus 38.3%, $\chi^2_1 = 7.71$, $P < .01$) (Table 1). The control population also reported that their family and friends had expressed concern about such weight-control practices (26.3% versus 13.4%, $\chi^2_1 = 8.73$, $P < .01$). No varsity athlete reported current use of laxatives as a weight-loss practice (1.9% of controls, nonsignificant); 2.7% reported past use (5.7% of controls, nonsignificant). Only 1 athlete (0.7%) reported current vomiting to control weight (1.9% of controls, nonsignificant); 6% of athletes reported past vomiting (10% of controls, nonsignificant). Approximately 26% of the controls and 18% of the athletes reported a past or current eating disorder (eg, binge eating, bulimia, anorexia) ($P > .05$) (Table 2). Approximately 12% of both groups reported a current binge-eating problem, 1% (2 controls, 1 athlete) current bulimia, and 1% (2 controls, 1 athlete) current anorexia.

Alcohol Drinking and Behaviors

Nondrinkers were equally represented in both groups (controls, 12.8%; athletes, 15.5%). Controls did not differ from athletes in total number of drinks per 2-week period (8.6 ± 10.0 versus 6.9 ± 9.0) or occasions of binge drinking (≥ 4 drinks per occasion of drinking) (1.1 ± 1.7 versus 1.0 ± 1.4). However, controls reported more occasions of drinking in the 2-week period (3.0 ± 3.2 versus 2.1 ± 3.0 , $F_{1,354} = 5.80$, $P = .016$). Approximately half of both varsity athletes and control subjects reported an episode of binge drinking (50.3% of athletes, 44% of controls, nonsignificant) as well as acting in ways they regretted while under the influence of alcohol. More athletes than controls reported that friends or family had lied about the respondent's drinking habits (10.7% versus 3.8%, $P < .03$). Significant predictors of greater total alcohol consumption in the 2 weeks included an episode of binge drinking ($R^2 = .35$, $P < .001$), an elevated SMAST score (R^2 change = .03, $P = .0014$), and reporting regrettable actions while under the influence of alcohol (R^2 change = .025, $P = .01$). Sorority membership and guilt about drinking just missed inclusion in the regression equation (sorority, $P = .07$; guilt, $P = .09$). Regardless of athlete status, female students reporting a regrettable action while under the influence of alcohol also reported drinking at least 3 times as much as students who did not report such action (Table 3). The control population reporting a regrettable action had more occasions of drinking than athletes reporting such action.

Table 3. Reported Alcohol Consumption in a 2-Week Period by College Athlete Status and Regrettable Action While Under the Influence of Alcohol

	Regret?	Athletes*	Controls*
Total number of drinks†	Yes	10.3 ± 11.0 (77)	12.8 ± 11.2 (112)
	No	3.2 ± 3.9 (72)	3.8 ± 5.4 (97)
Occasions of drinking‡	Yes	3.0 ± 3.7 (77)	4.2 ± 3.6 (112)
	No	1.2 ± 1.4 (72)	1.6 ± 1.9 (97)
Occasions of binge drinking§	Yes	1.6 ± 1.6 (77)	1.8 ± 1.9 (112)
	No	0.4 ± 0.7 (72)	0.4 ± 0.8 (97)

*Mean (n).

†Regret "yes" versus regret "no," $F_{1,354} = 74.0$, $P < .001$; athletes versus controls, $F_{1,354} = 2.76$, $P = .098$; athletes by regret, $F_{1,354} = 1.16$, $P = .283$.

‡Regret "yes" versus regret "no," $F_{1,354} = 49.7$, $P < .001$; athletes versus controls, $F_{1,354} = 5.80$, $P = .016$; athletes by regret, $F_{1,354} = 2.04$, $P = .154$.

§Regret "yes" versus regret "no," $F_{1,354} = 72.7$, $P < .001$; athletes versus controls, $F_{1,354} = .33$, $P = .563$; athletes by regret, $F_{1,354} = 0.29$, $P = .592$.

Problem Drinking and Eating Behaviors

Binge drinking was not associated with reported bulimia or binge eating. However, controls who reported that they lied about their drinking habits were more likely to lie about their weight-control practices than controls who did not report lying about personal drinking habits (34% versus 19.4%, $P = .03$). No such difference was noted among the athletes.

DISCUSSION

Female athletes surveyed at 2 Division I-A universities did not have a greater prevalence of self-reported problem eating behaviors than a control population of nonathletes. The prevalence of current binge-eating disorder and bulimia nervosa was similar to that reported in a 1995 NCAA study.⁶ Our study population included a variety of female athletes from endurance sports and nonendurance sports. If anything, our control population had more problematic eating habits and behaviors than the athletes. This may reflect the presence of professionals such as athletic trainers at these schools devoted to educating and counseling female athletes. At both schools, a support system was present to help female athletes avoid and deal with problem eating and drinking behaviors. The support system included education for coaches, athletic trainers, and athletes on the signs and symptoms of eating disorders and alcohol abuse. The support system also provided referral for student-athletes when counseling was warranted. It is encouraging that

the most commonly reported weight-loss practices used by both athletes and nonathletes were appropriate lifestyle changes (ie, increasing exercise and limiting portion size). This suggests that college women are preferentially choosing healthy ways to control weight.

Binge drinking remains a problem at many universities,¹⁷ especially among women who are not of legal drinking age. The 50% prevalence of binge drinking among these female student-athletes (and the 44% rate among the control population) is slightly higher than the 39% reported by Wechsler et al.¹⁷ Others have noted that nearly 60% of NCAA Division I female college basketball, softball, and volleyball athletes engaged in binge drinking out of season and 35% in season.¹⁸ The fact that our prevalence rate fell within the range reported by Martin¹⁸ is possibly explained because some of our respondents were in season and others were out of season. Other authors^{17,19} have shown that sorority membership is a predictor of greater alcohol consumption. However, in our study, sorority membership was not a predictor of total alcohol consumption, which may be because of our limited data set. It is of concern that half of the women, both athletes and controls, reported acting in ways they regretted while under the influence of alcohol and not being able to remember what they had done. This has serious implications for unwanted sexual activity.²⁰ Nearly all students (98%) at one of the schools perceived an increased risk of having unprotected sex (ie, sex without condoms) subsequent to drinking.¹⁹ Additionally, binge drinking, even if it is from the night before, may influence athletic performance.²¹

We did not find major associations between self-reports of binge eating or bulimia and binge drinking, as have other authors.^{11,22} The only association found was in the control group, which reported lying about both weight-control and drinking habits. The absence of associations among the female athletes may point to the effectiveness of coach, athletic trainer, or peer-group counseling regarding the female athlete triad and the immediate hazards of binge drinking.²³ The absence of association may also be because of the limited population of students reporting bulimia nervosa and frank alcohol abuse. We did not have the ability to grade severity of disordered eating, and thus, we could not compare the various grades of disordered eating with prevalence of drinking or binge drinking.¹⁴

Limitations of this study include nonresponders, method of administration of the questionnaire to both student groups, inherent problems of using questionnaires and self-report items in eating disorder and alcohol research, and the athlete population studied. With regard to the issue of nonresponders, denial is common among those with drinking problems²⁴ and may be reflected in those who chose not to respond. However, the response rates of 55% for the athletes and 63% for the controls should ensure that the responders were a reasonable representation of the population. With respect to the method of administration of the questionnaire, part of the control population came from the student health center, potentially introducing bias toward a group of women who were more disease oriented. It is possible that respondents may not have used the same 2-week period for reporting alcohol consumption. Also, many of the athletes were in season. College athletes report decreased alcohol consumption in the competitive season as compared with the rest of the school year.²⁵ Using questionnaires to ascertain prevalence of disordered eating relies on self-report and not on actual clinical diagnosis. This may result

in lower reported prevalence rates. As summarized by Wilmore,³ numerous authors have shown a high prevalence of suspected or confirmed eating disorders in female athlete populations surveyed by questionnaire. Because of the unique nature of the issues addressed in our investigation, previously used questionnaires were not entirely appropriate. Our survey included a number of eating-related factors, including questions on body image, weight-control practices, and general eating habits (eg, frequency of fast-food meals). We also included questions on drinking activities, including the previously validated SMAST.¹⁵ Multiple investigators^{26–28} have found self-report survey instruments valid in ascertaining alcohol use. Finally, our population of athletes did not include all types of female athletes. We did survey cross-country runners but not gymnasts or figure skaters. Classically, these groups are very conscious of body image and weight.^{29,30} However, neither school had such varsity teams.

In summary, we did not find a greater prevalence of self-reported disordered eating behaviors or problem drinking behaviors among female collegiate athletes as compared with a control population. Additionally, we did not find a significant relationship between self-reported alcohol use and eating disorders. Our findings may reflect the presence of a supportive environment for the female athletes at these 2 schools or a general trend toward healthy lifestyle choices among female varsity athletes. It is crucial that all schools provide their female athletes sound nutritional information, communicate openly about disordered eating and substance abuse, and offer a structure through which screening, intervention, and treatment can occur. It is best to deal with such concerns proactively. The athletic trainer is in a unique position to provide such counseling and guidance and, when necessary, refer collegiate athletes to appropriate care providers.

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