Substance Use Among College Athletes: A Comparison Based on Sport/Team Affiliation

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Abstract. **Objective**: Prior research shows that college athletes have higher rates of substance use, especially alcohol, than do college students who are not involved in athletics. To augment the literature, the author sought to determine which sports/teams are at the greatest risk for substance use. **Participant**s: The author used data from the 1999 Harvard School of Public Health College Alcohol Study, a national survey of college and university students in the United States. **Methods**: A series of chi-square and logistic regression models examined variation in substance use among college athletes on the basis of sport/team affiliation. **Results**: Findings indicated that male hockey and female soccer athletes were the most likely to report substance use and that male basketball and cross-country/track athletes reported lower levels of substance use. **Conclusion**: There is variation in substance use on the basis of sport/team affiliation, and future researchers should examine why certain groups of athletes have higher rates of substance use.
Keywords: alcohol, athletics, other drugs

In 2001, nearly 16 million individuals were enrolled in postsecondary education programs in the United States, with a projected enrollment as high as 19 million by 2013.[1] Researchers[2–5] have demonstrated that college students engage in risky behaviors. One risky behavior in which large numbers of college students participate is alcohol and other drug use. Because of the large number of college students and their propensity to engage in risky behavior, research on this population is important.

A substantial amount of literature focuses on alcohol use among college students.[2,3,6–9] O'Malley and Johnson[6] reviewed several nationally representative data sets (College Alcohol Study, Core Institute, Monitoring the Future, National College Health Risk Behavior Survey, and National Household Survey on Drug Abuse) and found a fairly consistent pattern: Approximately 70% of college students reported alcohol use in the past month and about 40% reported binge drinking. College students also have higher rates of alcohol use and binge drinking than do young adults who do not attend college.[2,7–9] According to the 2003 Monitoring the Future Survey,[2] 66% of college students report past-month alcohol use and 39% report binge drinking, whereas only 58% of their noncollege-age peers report past-month use and 34% report binge drinking.

The literature on illicit drug use among college students is more limited. Findings from the Monitoring the Future Survey allow for a comparison of substance use among college students and other young adults. Results revealed that about 34% of college students reported marijuana use and 18% reported other illicit drug use in the past year.[2] Unlike alcohol, however, research suggests college students have similar or even lower levels of illicit drug use than do their noncollege-age peers.[2,7] Young adults not attending college have slightly higher rates of marijuana use (36%) and other illicit drug use (24%) in the past year.[2]

What may be of greater concern, however, is the increase in substance use among college students and young adults in general. The prevalence of binge drinking remained relatively stable between 1993 and 2001, but the prevalence of frequent binge drinking (binge drank 3 or more times in past 2 weeks) increased.[3] Although the percentage of college students who are binge drinkers has changed little over time, it appears that those who are binge drinkers binge more often now than in the past. Moreover, both marijuana and other illicit drug use among college students has increased in recent years.[2,4,5] From 1991 to 2003, annual marijuana use increased from 26.5% to 33.7% and annual other illicit drug use increased from 13.2% to 17.9%.[2]

These findings indicate that a large number of young adults are attending college, a significant percentage of college students are substance users, and a significant increase in substance use among college students has occurred over the past 10 years. Young adults who attend college also have higher rates of alcohol use and binge drinking than do young adults who do not attend college. As a result, there has been an abundance of researchers examining risk and protective factors for substance use among college students. Researchers[10–16] have focused on the area of

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involvement in intercollegiate athletics quite extensively. Findings from those studies indicate that college athletes have higher rates of substance use, especially alcohol, than do nonathletes.[10,11,13–16] However, these researchers have not examined variation in substance use among athletes on the basis of sport/team affiliation.

College Athletes and Substance Abuse

Research results from studies of college students indicate that individuals involved in athletics are more likely to engage in a wide range of risky behaviors than are nonathletes.[10–16] College athletes are at greater risk for alcohol use: Athletes report more extreme styles of alcohol consumption, binge drink at higher rates, are more likely to binge when they drink, and get drunk more often.[10,11,13–16] Binge drinking also appears to increase as involvement in athletics increases.[10,11,16] For example, team leaders report higher levels of binge drinking than do other team members.[11] Athletes are also more likely to experience alcohol-related negative consequences than are nonathletes (eg, hangovers, academic problems, relationship problems, criminal behavior and victimization, being hurt or injured, and unplanned/unprotected sex).[11,12,14] However, few researchers[15,16] have compared athletes and nonathletes with regard to illicit drug use, and findings are inconclusive. For example, Selby, Weinstein, and Bird[15] found that athletes had higher levels of marijuana use, but Wechsler et al[16] found that athletes had lower levels of marijuana use.

A number of factors may explain the higher levels of substance use among athletes. Student athletes have been described as a special population among college students.[16] The dual roles of student and athlete create a unique collegiate experience that place them at greater risk for substance use.[16] Researchers[15–18] point to a number of distinct concerns for college athletes: maintaining a high level of athletic performance while responding to stress; balancing academic and athletic interests; career concerns, including termination; social isolation; injuries as a major medical/psychological concern; managing success or the lack of success; and managing multiple relationships with coaches, teammates, family, friends, and teachers. Given the increased risk for alcohol use and other risky behaviors, it seems clear that researchers must continue to examine the health-risk behaviors of college athletes.

In an effort to go beyond existing literature, I focused on addressing the variation in substance use among athletes on the basis of sport/team affiliation. It appeared likely that there would be variation in substance use on the basis of sport/team affiliation, just as there is variation in substance use in the general student population. For example, college students involved in Greek life (ie, fraternities and sororities) report higher levels of binge drinking than do other college students.[19–21] It seems possible that some sports/teams create a setting that promotes or condones substance use, whereas other sports/teams foster an environment that disapproves of or discourages substance use. If certain sports/teams have higher rates of substance use, college administrators, who already target athletes with substance abuse programs, could target specific sports/teams. Furthermore, because of the dearth of research on the topic, this research should help clarify patterns of substance use among college athletes.

METHODS

The data I used in this study are from the Harvard School of Public Health College Alcohol Study (CAS). The CAS examines substance use, primarily alcohol, and other health-risk behaviors of college students. Researchers involved in the initial wave of data collection (1993) used a nested random sampling design to survey students at 195 US colleges and universities. Investigators generated the original sample of schools from a list of 4-year schools provided by the American Council on Education. Administrators at these schools provided a random sample of students to researchers, who then mailed a 20-page self-administered questionnaire to students. The research design included follow-up surveys, using the same sample of schools in 1997, 1999, and 2001. For additional information on the sampling design and data collection, see the work of Wechsler et al.[5,22]

I used data from the 1999 survey, which was the most current data available to the public. The 1999 CAS contains information on more than 14,000 students at 119 4-year schools in 39 states. Researchers dropped schools from the sample for 3 major reasons: they did not provide a random sample of students in a timely manner, the response rate was too low, or the school chose to no longer participate in the study.[23] The sample is representative of US colleges and universities, including students from both private and public institutions; large, medium, and small schools; and schools located in urban, suburban, and rural settings.

My focus was recreational substance use, not performance-enhancing drugs, such as steroids. Alcohol use is operationalized as *binge drinking* during college and is a dichotomous variable (1 = yes). On the basis of the CAS, a male respondent was a binge drinker if he had "5 or more drinks in a row during the past 2 weeks" and a female respondent was a binge drinker if she had "4 or more drinks in a row during the past 2 weeks."[24] According to the CAS, 1 drink equals a 12-oz can/bottle of beer, a 4-oz glass of wine, a 12-oz wine cooler, or a 1.25-oz shot of liquor.[24] Illicit drug use during the past year is also a dichotomous variable (user = 1). Respondents were *marijuana users* if they reported marijuana use during this period and *other illicit drug users* if they reported the use of crack cocaine, other forms of cocaine, barbiturates, amphetamines, tranquilizers, heroin, other opiate-type drugs, LSD, other psychedelics or hallucinogens, or ecstasy during the period.

The measure of *sport/team affiliation* is based on the following survey question: "If you currently participate in intercollegiate athletics at your university, please indicate which sport you participate in: football, volleyball, soccer, swimming and diving, cross-country, gymnastics, basketball, hockey, baseball or softball, track and field, and other." To focus on individual sports/teams, a series of dummy vari-

ables measured sport/team affiliation. For example, I coded respondents as (1) a football player if they reported being a member of the football team and all other athletes as (0) other athletes. This coding strategy created 8 different categories of sport/team affiliation: football, volleyball, soccer, swimming/diving, basketball, hockey, baseball/softball, and running (respondents who reported being involved in either cross-country or track). By limiting the analysis to only respondents who participated in intercollegiate athletics, the sample size reduced to 2,316. Because the CAS is a random sample of college and university students in the United States, this subsample of athletes should be generalizable to the wider population of college athletes in the United States.

The analysis included several control measures. The dichotomous control variables included race (white = 1), Hispanic ethnicity (yes = 1), age (aged 23 years and older = 1), marital status (never married = 1), living arrangement (off campus = 1), Greek affiliation (yes = 1), and grade point average (GPA; B+ or better = 1). These variables and their coding scheme are common controls when predicting college substance use, particularly by researchers who are using the CAS.[5,23]

Analytic Strategy

The analysis included 2 steps. First, I used chi-square tests to examine the relationship between substance use and sport/team affiliation. This provided a basic understanding of the relationship between each measure of substance use and sport/team affiliation. Second, I used a series of logistic regression equations to examine the relationship between substance use, sport/team affiliation, and controls. I regressed each measure of substance use on each sport/team measure and control variables to determine if the relation between substance use and sport/team affiliation remained significant once I included pertinent controls in the model.

On the basis of findings of significant gender differences in both alcohol[6,13,14,25] and illicit drug use,[26–29] I split this sample on the gender of the respondent. Therefore, I compared male basketball athletes with all other male athletes; I compared female volleyball athletes with all other female athletes. Wilson et al[13] also reported a significant interaction between gender and athletic status. Female athletes generally report the lowest levels of drinking behavior, followed by female nonathletes and male nonathletes. Male athletes report generally the highest levels of drinking.

RESULTS

Table 1 shows demographic and other sample characteristics. Of the 2,316 athletes included in the analysis, 10.5% named football, 11% named volleyball, 14.5% named soccer, 6.4% named swimming/diving, 15.5% named basketball, 3.5% named hockey, 7.9% named baseball/softball,

TABLE 1. Descriptive Statistics of Student Athletes Participating in Substance Abuse Survey

	Total*				Men†				Women‡			
Variable	*M*	*SD*	*n*	%	*M*	*SD*	*n*	%	*M*	*SD*	*n*	%
Substance use												
Binge drinking	.441	.497			.538	.499			.393	.491		
Marijuana year	.264	.441			.282	.443			.260	.438		
Illicit year	.129	.335			.134	.344			.116	.327		
Control												
Male	.516	.500			—	—			—	—		
White	.729	.445			.712	.453			.747	.435		
Hispanic	.074	.261			.074	.262			.074	.261		
Older than 23	.102	.302			.120	.325			.081	.274		
Never married	.951	.216			.954	.210			.948	.222		
Off campus	.420	.494			.463	.499			.374	.484		
Greek	.157	.364			.176	.381			.137	.344		
Grade B+ or better	.486	.500			.446	.497			.529	.499		
Sport/team affiliation												
Football			243	10.5			229	19.0			14	1.3
Volleyball			255	11.0			98	8.1			157	14.1
Soccer			336	14.5			208	17.3			128	11.5
Swimming/diving			149	6.4			64	5.3			85	7.6
Basketball			360	5.5			233	19.4			127	11.4
Hockey			81	3.5			65	5.4			16	1.4
Baseball/softball			182	7.9			114	9.5			68	6.1
Running			228	9.9			133	11.1			95	8.5
Other			482	20.8			59	4.9			423	38.0

Note. All measures are dichotomous.
*N = 2,316.
†n = 1,203.
‡n = 1,113.

and 9.9% named cross-country or track-and-field as their sport. I coded the remaining 20.8% of athletes as involved in other sports. Table 1 also shows the descriptive statistics for the substance use variables. Male athletes (54%) were significantly more likely to report binge drinking than were female athletes (39%). (Findings for the chi-square tests discussed here are not shown in the table.) Athletes were also significantly more likely to report binge drinking than were nonathletes: about 49% of male and 29% of female nonathletes reported binge drinking. Male athletes also had higher levels of marijuana use (26% to 28%) and other illicit drug use (12% to 13%) than did female athletes, but these gender differences were not significant. Compared with other students, male athletes were significantly less likely to report marijuana and other illicit drug use than were nonathletes. Roughly 31% of male nonathletes reported marijuana use, and 16% reported other illicit drug use. There were no significant differences in marijuana and other illicit drug use between female athletes and nonathletes. Approximately 25% of female nonathletes reported marijuana use, and 12% reported other illicit drug use.

Table 2 shows the results for the chi-square analysis of substance use and sport/team affiliation. For male athletes, both hockey (75.4%) and baseball (64.6%) athletes were more likely to report binge drinking. Soccer players (47.1%) and runners (40.9%) were less likely to report binge drinking. Hockey athletes were also more likely to report marijuana use (38.5%), whereas basketball athletes (19.1%) and runners (16.3%) reported lower levels. For other illicit drug use, basketball athletes (8.6%) and runners (10.1%) were less likely to report use. For female athletes, the findings clearly indicated that soccer athletes were the most likely to report substance use: 46.9% reported binge drinking, 37.8% reported marijuana use, and 23% reported other illicit drug use. Female runners and swimming/diving athletes were less likely to report substance use than were other female athletes: 26.6% of runners reported binge drinking, 16.5% of swimming/diving athletes reported marijuana use, and 4.9% of swimming/diving athletes reported other illicit drug use.

TABLE 2. Proportion Reporting Substance Use, Based on Sport/Team Affiliation

	Men		Women	
Sport/team affiliation	Other	Interest	Other	Interest
	Binge drinking			
Football	52.3	58.4	NA	NA
Volleyball	53.9	48.0	35.0	39.7
Soccer	54.8	47.1*	34.2	46.9**
Swimming/diving	53.4	54.0	36.2	29.4
Basketball	54.2	50.2	35.5	36.5
Hockey	52.2	75.4***	NA	NA
Baseball/softball	52.3	64.6**	35.5	38.2
Running	55.0	40.9**	36.5	26.6*
	Marijuana			
Football	26.9	26.3	NA	NA
Volleyball	27.1	23.5	26.0	25.0
Soccer	27.2	24.9	24.4	37.8***
Swimming/diving	26.6	30.2	26.7	16.5*
Basketball	28.6	19.1***	26.2	23.2
Hockey	26.1	38.5*	NA	NA
Baseball/softball	26.7	27.4	25.9	26.5
Running	28.0	16.3**	26.1	23.7
	Other illicit drugs			
Football	13.4	14.6	NA	NA
Volleyball	13.5	15.6	12.2	11.7
Soccer	13.2	16.0	10.7	23.0***
Swimming/diving	13.8	11.3	12.7	4.9*
Basketball	14.9	8.6*	12.6	8.9
Hockey	13.4	18.8	NA	NA
Baseball/softball	13.7	12.8	12.2	11.9
Running	14.1	10.1*	12.2	12.1

Note. The column labeled "Interest" refers to a specific sport/team; "Other" refers to the remaining athletes. For example, 58.4% of male football athletes reported binge drinking, whereas 52.3% of all other male athletes reported binge drinking. NA = not applicable.
*$p < .05$. **$p < .01$. ***$p < .001$.

Table 3 shows the results of the logistic regression analyses and includes the odds ratio (OR) and 95% confidence interval (CI) for only the main variable of interest, sport/team affiliation. Included in all of the logistic regression analyses, but not shown in the tables, were controls for race, ethnicity, age, marital status, living arrangement, Greek affiliation, and grades. The controls generally were significant predictors of substance use in the expected directions. Students who were white, Hispanic, younger, never married, living off campus, Greek members, and making lower grades were more likely to report binge drinking. Students who were white, younger, never married, Greek members (males only), and making lower grades were more likely to report for marijuana use. Students who were white, never married, off campus, and making lower grades were more likely to report other illicit drug use.

The findings of the logistic regression analyses were notably similar to those of the chi-square tests. For male athletes, there were significant findings for 3 sports/teams. Hockey athletes were more likely to report both binge drinking (OR = 2.441) and marijuana use (OR = 1.694). Basketball athletes were less likely to report marijuana (OR = 0.613) and other illicit drug use (OR = 0.587). Runners were less likely to report binge drinking (OR = 0.566) and marijuana use (OR = 0.554). For female athletes, the soccer athletes were more likely to report binge drinking (OR = 1.475), marijuana use (OR = 1.724), and other illicit drug use (OR = 2.452). There were no female sports/teams that reported significantly lower levels of substance use.

COMMENT

The results of the chi-square analysis indicated that there were significant differences in substance use on the basis of sport/team affiliation. Male hockey and female soccer athletes reported higher levels of substance use. Male soccer, basketball, and cross-country/track athletes and female cross-country/track and swimming/diving athletes reported lower levels of substance use. Furthermore, the logistic regression findings clearly indicated that male hockey and female soccer athletes were at the greatest risk for substance

TABLE 3. Logistic Regression Impact of "Sport/Team Affiliation" on Substance Use

	Binge drinking		Marijuana use		Other illicit drugs	
Gender	OR	95% CI	OR	95% CI	OR	95% CI
			Football			
Male	1.311	0.945–1.819	0.901	0.634–1.280	1.092	0.705–1.690
Female	NA	NA	NA	NA	NA	NA
			Volleyball			
Male	0.886	0.560–1.401	0.880	0.527–1.470	1.292	0.717–2.327
Female	1.243	0.863–2.171	0.901	0.601–1.350	0.899	0.512–1.544
			Soccer			
Male	0.862	0.618–1.204	0.976	0.675–1.409	1.344	0.868–2.083
Female	1.475*	1.002–2.171	1.724**	1.157–2.569	2.452***	1.524–3.954
			Swimming/diving			
Male	1.246	0.704–2.207	1.145	0.629–2.087	0.716	0.300–1.709
Female	0.890	0.537–1.477	0.634	0.347–1.159	0.415	0.148–1.165
			Basketball			
Male	1.063	0.773–1.463	0.613**	0.421–0.892	0.587*	0.352–0.980
Female	0.966	0.642–1.454	0.802	0.505–1.272	0.726	0.375–1.404
			Hockey			
Male	2.441**	1.319–4.516	1.694*	0.993–2.889	1.441	0.744–2.793
Female	NA	NA	NA	NA	NA	NA
			Baseball/softball			
Male	1.226	0.792–1.898	0.808	0.509–1.282	0.852	0.467–1.555
Female	0.900	0.530–1.528	0.925	0.523–1.635	0.946	0.437–2.046
			Running			
Male	0.566**	0.378–0.848	0.554*	0.336–0.914	0.627	0.324–1.188
Female	0.656	0.397–1.083	0.853	0.502–1.448	0.987	0.492–1.980

Note. The logistic regression models also include several controls not shown in the table: race, Hispanic ethnicity, age, marital status, living arrangement, Greek affiliation, and grade point average. OR = odds ratio; CI = confidence interval; NA = not applicable.
*$p < .05$. **$p < .01$. ***$p < .001$.

use. Male hockey athletes were more than twice as likely to report binge drinking and nearly twice as likely to have used marijuana than were all other male athletes. Female soccer athletes were about 48% more likely to report binge drinking, 72% more likely to report marijuana use, and nearly 2.5 times more likely to report other illicit drug use than were all other female athletes. In contrast, male basketball and cross-country/track athletes reported lower levels of substance use. Basketball athletes were about 40% less likely to have used both marijuana and other illicit drugs, and cross-country/track athletes were about 45% less likely to report binge drinking and marijuana use than were all other male athletes.

Previous research indicates that, compared with other college students, athletes are at a greater risk for substance use, especially alcohol. Building on these findings, I showed that there is variation in substance use on the basis of sport/team affiliation. Findings revealed that male hockey and female soccer athletes were at the greatest risk for substance use, whereas male basketball and cross-country/track athletes had lower levels of use. Researchers in future studies should investigate this topic in detail to determine why certain sports/teams have higher rates of substance use, whereas other sports/teams have lower levels of substance use.

A possible explanation for this variation in substance use is social norms. For young adults, such as college students, peer norms and behavior are strong predictors of alcohol and other drug use.[30–33] Experts taking the social norms approach argue that group norms can influence and control individual behavior. Social norms are powerful because people tend to adopt the attitudes and behaviors of their social and reference groups. Social norms are especially meaningful for college students because they are introduced to a new social environment where they must navigate unfamiliar social situations. During these ambiguous times, normative influences on behavior are enhanced.[34] As college students enter new social situations, it is often difficult for them to rely on normative guidelines from the past; consequently, they look to their new social groups to help them determine what attitudes and behaviors are now appropriate.

Peer influence is also especially significant for highly integrated groups. For example, college students who report excessive exposure to peers have higher levels of drinking.[35] Athletes tend to be socially isolated, spending the majority of their time with teammates and other athletes.[17,18] College athletes, therefore, are somewhat isolated from the influence of other groups. In a peer-intensive context like college athletics, peer norms are likely to have a greater impact on behavior because individuals feel pressure to conform to group expectations of behavior.[36] When substance use is normative for the group/team, individuals may feel compelled to use substances to avoid negative sanctions by other group/team members.

Researchers should examine the following questions concerning social norms among college athletes in general and within specific sports/teams. First, are the social norms regarding substance use similar for athletes and nonathletes? It is possible that social norms mediate the relationship between substance use and athletic involvement among college students. College athletes are already viewed as a special population on college campuses, having access to support services, such as substance use programs, which go beyond the services offered to the general student population.[14] If social norms are important predictors of substance use among athletes, experts leading prevention and treatment programs focused on college athletes should implement a social norms approach.

Second, do social norms for substance use vary on the basis of sport/team affiliation? Within this social norms context, it is possible that certain sports/teams promote a culture of substance use (eg, hockey or soccer), whereas other sports/teams foster antidrug attitudes and behaviors (eg, basketball or cross-country/track). A close examination of differences in social norms for substance use on the basis of sport/team affiliation could also help college administrators more effectively deal with substance use among college athletes. Researchers should focus on the differences in social networks among teams. It seems possible that some sports/teams will place more pressure on members to conform to the norms of the group than will other sports/teams.

Third, are college athletes likely to limit their substance use if they believe it will harm their athletic performance? Prior research results suggest that this is true[14]; however, the acceptance of the idea that substance use harms athletic performance may vary from one sport/team to another. This may help to explain the variation in substance use on the basis of sport/team affiliation. Past research results also suggest that athletes may use drugs as a way to cope with stress.[13] It seems possible that certain sports/teams place more stress or strain on athletes, leading to elevated levels of substance use to cope with the added stress. Researchers should investigate whether these factors can explain this variation in substance use on the basis of sport/team affiliation.

NOTE

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