

# Correlates of Rape while Intoxicated in a National Sample of College Women\*

MEICHUN MOHLER-KUO, SC.D., GEORGE W. DOWDALL, PH.D.,<sup>†</sup> MARY P. KOSS, PH.D.,<sup>†</sup> AND HENRY WECHSLER, PH.D.<sup>†</sup>

*Department of Society, Human Development and Health, Harvard School of Public Health, 677 Huntington Avenue, Boston, Massachusetts 02115*

**ABSTRACT.** *Objective:* Heavy alcohol use is widespread among college students, particularly in those social situations where the risk of rape rises. Few studies have provided information on rapes of college women that occur when they are intoxicated. The purpose of the present study was to present prevalence data for rape under the condition of intoxication when the victim is unable to consent and to identify college and individual-level risk factors associated with that condition. *Method:* The study utilizes data from 119 schools participating in three Harvard School of Public Health College Alcohol Study surveys. The analytic sample of randomly selected students includes 8,567 women in the 1997 survey, 8,425 in the 1999 survey, and 6,988 in the 2001 survey. *Results:* Roughly one in 20 (4.7%)

women reported being raped. Nearly three quarters (72%) of the victims experienced rape while intoxicated. Women who were under 21, were white, resided in sorority houses, used illicit drugs, drank heavily in high school and attended colleges with high rates of heavy episodic drinking were at higher risk of rape while intoxicated. *Conclusions:* The high proportion of rapes found to occur when women were intoxicated indicates the need for alcohol prevention programs on campuses that address sexual assault, both to educate men about what constitutes rape and to advise women of risky situations. The findings that some campus environments are associated with higher levels of both drinking and rape will help target rape prevention programs at colleges. (*J. Stud. Alcohol* 65: 37-45, 2004)

A RECENT DEPARTMENT OF JUSTICE study estimated that a woman has between a one in four and one in five chance of being raped during her college years (Fisher et al., 2000). Koss and colleagues (1987) assessed the amount and type of unwanted sexual contact in a national sample of 32 institutions of higher education. They found that more than 15% of college women had experienced a completed rape since the age of 14, and an additional 12% had experienced attempted rape. Of these women, 17% had experienced either rape or attempted rape in the previous year. Abbey (2002) reviewed the literature and concluded that similar prevalence rates have been found in studies conducted at colleges throughout the United States (Abbey et al., 1996a; Copenhaver and Grauerholz, 1991; Mills and Granoff, 1992; Muehlenhard and Linton, 1987).

Alcohol-related sexual assault is a common problem among college students (Abbey, 2002). Previous studies have shown that alcohol use is associated with at least 50% of sexual assaults on female college students (Abbey, 2002; Abbey et al., 1996a; Koss et al., 1987; Presley et al., 1997;

Testa, 2002, for a review). Koss (1988) reported that 74% of the perpetrators and 55% of the victims of rape in her nationally representative sample of college students had been drinking alcohol. Muehlenhard and Linton (1987) found that alcohol was consumed by 55% of the men and 53% of the women who reported sexual assault on a date. They also found that sexually assaultive dates were more likely than nonassaultive dates to involve heavy alcohol consumption by both men and women. Harrington and Leitenberg (1994) also found that 55% of the sexual assaults reported by college women involved alcohol consumption. Ullman and Breklin (2000) reported that 100% of the incidents in which the victim was drinking involved perpetrator drinking. Previous research has found that incidents involving substance use for both victims and perpetrators were more likely to originate outside the home and to involve a perpetrator who was not an intimate partner than were incidents in which neither party or only the perpetrator was drinking (Abbey et al., 1996a, 2002). The victim's heavy drinking and alcohol use by both victim and offender prior to attack were directly associated with more severe sexual victimization of women (Ullman et al., 1999).

For college women, alcohol use and heavy alcohol use are widespread (Wechsler et al., 1994), particularly in those social situations where the risk of rape arises. Heavy episodic drinking is arguably the most important public health issue among college students and is associated with a range of health and behavioral problems, both for the individual drinker and for those in the immediate environment

Received: April 8, 2003. Revision: September 2, 2003.

\*This study was supported by grant 035965 from the Robert Wood Johnson Foundation.

<sup>†</sup>Correspondence should be sent to Henry Wechsler, Ph.D., at the above address, or via email at: hwechsle@hsph.harvard.edu. George W. Dowdall is with St. Joseph's University Hospital, Philadelphia, PA. Mary P. Koss is with the Mel and Enid Zuckerman Arizona College of Public Health, University of Arizona, Tucson, AZ.

(Wechsler et al., 1994, 1995b, 2000, 2002). Abbey (2002) in a review of alcohol-related sexual assaults among college students summarized previous research regarding alcohol's role in college sexual assaults: "Alcohol increases the likelihood of sexual assault occurring among acquaintances during social interactions through several interrelated pathways. These pathways include beliefs about alcohol, deficits in higher order cognitive processing and motor impairments induced by alcohol and peer group norms that encourage heavy drinking and forced sex" (p. 125). In general, men expect to feel more powerful, sexual and aggressive after alcohol consumption (Brown et al., 1980; George and Norris, 1991; Presley, 1997). Abbey et al. (1996b) found college men who had committed sexual assault when they were intoxicated had greater expectations that alcohol increased male and female sexuality than did college men who committed sexual assault when sober, suggesting beliefs of alcohol's effects may have encouraged these behaviors. Alcohol consumption impairs higher order cognitive processes, thus enhancing the misperception of sexual intent to the point of forced sex. Alcohol also affects women's motor skills, limiting their ability to resist sexual assault effectively. Studies have found intoxicated victims are less able to find a way to escape or less likely to use physical resistance strategies (Abbey et al., 1996b; Harrington and Leitenberg 1994). It is also found that peer group norms in some college environments, such as fraternities and sororities, are to drink heavily and to engage in casual sex. Alcohol is often used as a justification for engaging in inappropriate behaviors (Abbey, 2002).

Other risk factors for sexual assaults well established in previous studies include dating, previous sexual experiences (both forced and voluntary), sex and gender role attitudes, personality characteristics of perpetrators, peer group influences and exposure to sexually violent media (Abbey et al., 1996a; Berkowitz, 1992; Malamuth and Briere, 1986; Scully, 1990; White and Koss, 1991). Additional studies have found that women reporting any type of sexual assault reported more sexual partners and earlier initiation of sexual activity than did women who had not been sexually assaulted (Abbey et al., 2002; Gidycz et al., 1995). Marx et al. (2000) reported that women experiencing sexual assault involving substance use for both parties reported more alcohol and drug use and higher prevalence of lifetime alcohol dependence. Women who reside in sorority houses or belong to sororities are at higher risk (Copenhaver and Grauerholz, 1991; Norris et al., 1996). Previous research on sorority women found almost half the women had experienced some form of sexual coercion; 24% experienced attempted rape, and 17% were victims of completed rape (Copenhaver and Grauerholz, 1991). Almost half of the rapes occurred in a fraternity house, and over 50% occurred either during a fraternity function or were perpetrated by a fraternity member.

Few studies have provided information on rapes of college women that occur when they are intoxicated. The purpose of the present study was to present prevalence data for rape under the condition of intoxication when the victim is unable to consent, using epidemiological data from 1997, 1999 and 2001 Harvard School of Public Health College Alcohol Study (CAS) surveys. The college environment and characteristics and the individual risk factors associated with such rape were examined. Although individual risk factors associated with sexual assaults have been well established in previous research, the college environment and characteristics have not been examined. It was hypothesized in this study that college women who are in heavier drinking environments (such as colleges with higher heavy episodic drinking rate) are more likely to be raped.

## Method

### *Study population*

The study used data from the 1997, 1999 and 2001 CAS surveys. The CAS was first conducted in 1993 at 140 colleges in 40 states. In the subsequent 1997, 1999 and 2001 surveys, 120 of these colleges participated. For each survey, the administrators at each college were asked to provide a random sample of undergraduates drawn from the total enrollment of full-time students. The attrition of 20 schools was primarily a result of the inability of these colleges to provide a sample of students and mailing addresses to meet the time constraints of the survey. We excluded one school with a response rate that was substantially lower than that of the other schools, leaving 119 schools. A random sample of 215 students was selected at each school for the study sample. Because the demographic characteristics of the student sample for each school may not be a perfect reflection of the true demographic characteristics of that school and could therefore bias our results, data were weighted based on sex, age and ethnicity to account for colleges' varying sampling fractions. Details of the sampling methods and inclusion criteria are described elsewhere (Wechsler et al., 1994, 2000, 2002).

The sample of 119 colleges represents a national cross-section of students enrolled at 4-year colleges. Of the respondents, 69% attended public colleges, and 31% attended private colleges. The U.S. national distribution between private and public colleges is 68% and 32%, respectively, for full-time 4-year college students (Department of Education, 1997). Regarding size of college, 47% of respondents attended large colleges (>10,000 students), 23% medium-sized (5,001-10,000 students) and 29% small (<5,001 students). The U.S. national distribution is 37%, 24% and 40%, respectively (Department of Education, 1997). There were more large and fewer small colleges in our sample compared with the national distribution, mainly as a result of

the probability proportionate to size sampling used in the CAS. Of the respondents, 69% attended schools in large or medium-sized cities, compared with 71% of students nationwide, and 13% attended religiously affiliated schools, compared with 16% nationwide (Department of Education, 1997); 5% of the students attended women's colleges.

The analytic sample included all college women in the 1997 ( $N = 8,567$ ), 1999 ( $N = 8,425$ ) and 2001 ( $N = 6,988$ ) surveys. Characteristics of the respondents were similar in all three surveys. Half of the respondents were under 21 years of age, and three in four were white. In all three survey years, about two in five students lived in on-campus housing, 2% lived in sorority houses, and 56% lived in off-campus housing. About 13% of the respondents were members of a sorority.

College response rates differed by school year: 52% in 2001 (range 22-86%); 59% in 1999 (range 27-83%); 59% in 1997 (range 29-88%). Several procedures were used to examine potential bias introduced by nonresponders. No association was found between the response rate at each college and the different types of reported rape in each of the three survey years. The Pearson correlation coefficient between response rate and rape was  $r = -0.11$  ( $p = .233$ ) in 1997,  $r = -0.15$  ( $p = .099$ ) in 1999 and  $r = -0.088$  ( $p = .339$ ) for rape while intoxicated; and  $r = -0.16$  ( $p = .082$ ) in 1997,  $r = -0.045$  ( $p = .630$ ) in 1999 and  $r = -0.068$  ( $p = .462$ ) for other rapes. The response rate at individual colleges was not associated with the heavy episodic drinking rates at those schools. The Pearson correlation coefficient between a college's heavy episodic drinking rate and its response rate was  $r = 0.044$  ( $p = .635$ ) in 1997,  $r = 0.002$  ( $p = .984$ ) in 1999 and  $r = 0.170$  ( $p = .064$ ) in 2001.

### Measures

**Rape.** Questions on rape were introduced in the 1997 CAS and then repeated in 1999 and 2001. These items conform to the legal definition of rape in many states and have been used in other studies (Kilpatrick et al., 1997; Koss et al., 1987; Tjaden and Thoennes, 2000). Three questions were included: (1) Rape while forced: "Since the beginning of the school year, have you ever had sexual intercourse against your wishes because someone used force?" (2) Rape while threatened: "Apart from question 1, since the beginning of the school year, have you had sexual intercourse against your wishes because someone threatened to harm you?" (3) Rape while intoxicated: "Apart from questions 1 and 2, since the beginning of the school year, have you had sexual intercourse when you were so intoxicated that you were unable to consent?" The possible responses for each of these questions are "0 times, 1 time, 2 times, 3 or more times." These items were later dichotomized as "no" versus "yes."

**Heavy episodic drinking.** Heavy episodic drinking was defined as the consumption of an amount of alcohol large

enough to place the drinker at increased risk of experiencing alcohol-related problems and to place others at increased risk of experiencing second-hand effects (Wechsler and Austin, 1998; Wechsler et al., 1995a; Wechsler and Nelson, 2001). The measure was constructed from responses to four questions concerning (1) sex, (2) time period since last drink, (3) drinking five or more drinks in a row during the past 2 weeks and (4) drinking four or more drinks in a row during the past 2 weeks. On the basis of these responses, heavy episodic drinking was defined as the consumption at least once in the past 2 weeks of five or more drinks in a row for men and four or more drinks in a row for women. Missing data for any of these questions resulted in the exclusion of a student's responses from the analysis. Frequent heavy episodic drinkers participated in a heavy drinking episode three or more times in the past 2 weeks; occasional heavy episodic drinkers had done so once or twice in the same period. Nonheavy episodic drinkers had consumed alcohol in the past year but had not participated in a heavy drinking episode in the previous 2 weeks. Abstainers had not consumed any alcohol in the past year.

**College heavy episodic drinking rate.** A college's heavy episodic drinking rate is the percentage of students classified as heavy episodic drinkers on the basis of the aggregated self-report responses of students at that school to the heavy episodic drinking questions. Colleges were divided into three categories: (1) high-heavy episodic drinking schools where more than 50% of the students were heavy episodic drinkers, (2) medium-heavy episodic drinking schools with 36% to 50% heavy episodic drinkers and (3) low-heavy episodic drinking schools with 0% to 35% heavy episodic drinkers.

**High school heavy episodic drinking.** Students were asked "During your last year in high school, how many drinks did you usually have when you drank alcohol?" A high school heavy episodic drinker is defined as a male student who usually has five or more drinks or a female student who usually has four or more drinks.

**Use of illicit drug.** To assess illicit drug use, respondents were asked when, if ever, they had used any of the following drugs included in the CAS survey: marijuana, crack cocaine, other forms of cocaine, barbiturates (including prescription-type sleeping pills such as Quaaludes), amphetamines (including prescription-type stimulants such as speed), tranquilizers, heroin, other opiate type drugs (including codeine, Demerol and Percodan), LSD, other psychedelics or hallucinogenic drugs such as mushrooms or PCP and anabolic steroids. The 1997, 1999 and 2001 surveys also included ecstasy (MDMA). The response categories included never used; used, but not in the past 12 months; used, but not in the past 30 days; and used in the past 30 days. These responses were later dichotomized as "used in the past 12 months" versus "no" in the analysis.

### Data analysis

Statistical analyses were carried out using STATA survey estimation (StataCorp., 2001). Data were weighted to account for colleges' varying sampling fractions. We used contingency tables to present the prevalence of rape for all three survey years. Differences among the prevalence of rape between survey years were compared using Pearson chi-square statistics corrected for the survey design by applying the second-order correction of Rao and Scott (1984) and were converted into *F* statistics. We used odds ratios (OR) to examine the association between the correlates of rape and each condition of rape: rape while intoxicated, other rape (defined as rape while forced and rape while threatened) and any rape. Multiple logistic regression was used to provide the adjusted OR. The model examined the association of individual and college characteristics with rape while intoxicated. We did not include heavy episodic drinking in the model because an individual's heavy drinking level is by definition a necessary component of rape while intoxicated. We used Generalized Estimating Equations (GEE) (Liang and Zegar, 1986; Zegar et al., 1988) to obtain robust standard errors of the estimated regression coefficients of the regression models fit to the clustered outcomes from the study sampling scheme.

TABLE 1. Prevalence of rape since the beginning of school year (%)

	Total ( <i>N</i> = 23,980)	1997 ( <i>n</i> = 8,567)	1999 ( <i>n</i> = 8,425)	2001 ( <i>n</i> = 6,988)	Design- based <i>F</i> test	<i>p</i> value
While intoxicated	3.4	3.6	3.4	3.2	0.50	.602
Forced	1.9	2.1	1.8	1.7	1.37	.257
Threatened	0.4	0.5	0.3	0.3	3.32	.038
Any type of rape	4.7	5.1	4.5	4.3	2.43	.091

Note: Sample sizes vary slightly because of missing observations.

### Results

Table 1 presents the percent of college women who reported being raped since the beginning of the school year by type of rape and survey year. Roughly one in 20 college women experienced rape since the beginning of each school year. There were no significant differences among the three survey years except for rape by threat. Rape while intoxicated is the major type of forced sex. Among those who experienced rape since the beginning of the school year, 72% experienced rape while intoxicated.

Table 2 examines the relationship of college-level factors to rape. The school heavy episodic drinking level was the strongest risk factor for being raped while intoxicated. College women from medium- and high-heavy episodic

TABLE 2. Risk of rapes: College characteristics (*N* = 23,980)

	Rape while intoxicated		Other rape		Any rape	
	%	Crude odds ratio (95% CI)	%	Crude odds ratio (95% CI)	%	Crude odds ratio (95% CI)
School's heavy episodic drinking level						
Low	2.4	1.00	2.0	1.00	3.7	1.00
Medium	3.5	1.50 (1.24-1.82) <sup>†</sup>	2.1	1.07 (0.80-1.42)	4.8	1.31 (1.09-1.57) <sup>†</sup>
High	4.3	1.83 (1.49-2.25) <sup>†</sup>	2.1	1.07 (0.81-1.41)	5.4	1.47 (1.21-1.80) <sup>†</sup>
Campus ban on alcohol						
No	3.5	1.00	2.1	1.00	4.7	1.00
Yes	3.2	0.90 (0.71-1.15)	1.8	0.82 (0.64-1.06)	4.4	0.92 (0.74-1.13)
Rural						
No	3.1	1.00	2.0	1.00	4.4	1.00
Yes	4.0	1.28 (1.05-1.55) <sup>*</sup>	2.1	1.06 (0.84-1.34)	5.2	1.19 (1.00-1.41) <sup>*</sup>
Region						
West	2.7	1.00	2.3	1.00	4.2	1.00
South	3.6	1.33 (1.00-1.77) <sup>*</sup>	1.9	0.84 (0.59-1.19)	4.8	1.17 (0.89-1.54)
North Central	3.7	1.39 (1.03-1.87) <sup>*</sup>	2.2	0.98 (0.68-1.14)	5.0	1.22 (0.92-1.63)
North East	3.2	1.18 (0.87-1.60)	1.8	0.79 (0.53-1.19)	4.4	1.06 (0.78-1.44)
Public school						
No	3.0	1.00	1.7	1.00	4.1	1.00
Yes	3.6	1.19 (0.97-1.46)	2.2	1.31 (0.99-1.74)	4.9	1.20 (0.98-1.48)
Co-ed school						
No	3.1	1.00	2.5	1.00	4.9	1.00
Yes	3.4	1.09 (0.81-1.46)	2.0	0.82 (0.42-1.57)	4.7	0.95 (0.61-1.50)

\**p* < .05; <sup>†</sup>*p* < .01.

TABLE 3. Risk of rapes: Individual characteristics ( $N = 23,980$ )

	Rape while intoxicated		Other rape		Any rape	
	%	Crude odds ratio (95% CI)	%	Crude odds ratio (95% CI)	%	Crude odds ratio (95% CI)
Underage						
No	2.8	1.00	1.8	1.00	4.0	1.00
Yes	4.0	1.48 (1.26-1.72) <sup>†</sup>	2.3	1.33 (1.07-1.66)*	5.3	1.34 (1.17-1.53) <sup>†</sup>
White						
No	2.5	1.00	2.6	1.00	4.4	1.00
Yes	3.8	1.50 (1.23-1.82) <sup>†</sup>	1.9	0.73 (0.58-0.92)	4.8	1.11 (0.95-1.29)
Residence						
Off campus with parents	3.1	1.00	1.9	1.00	4.4	1.00
Off campus w/o parents	2.7	1.14 (0.86-1.50)	1.6	1.21 (0.87-1.69)	3.6	1.21 (0.95-1.55)
Sorority house	8.0	3.14 (2.05-4.80) <sup>†</sup>	3.6	2.31 (1.36-3.94) <sup>†</sup>	9.3	2.72 (1.86-3.98) <sup>†</sup>
On campus	3.8	1.41 (1.07-1.86)*	2.3	1.45 (1.07-1.96)*	5.1	1.44 (1.14-1.83) <sup>†</sup>
Sorority member						
No	3.1	1.00	2.0	1.00	4.4	1.00
Yes	5.3	1.74 (1.43-2.12) <sup>†</sup>	2.3	1.16 (0.87-1.55)	6.5	1.49 (1.24-1.80) <sup>†</sup>
High school heavy episodic drinking						
No	2.0	1.00	1.7	1.00	3.2	1.00
Yes	7.3	3.87 (3.34-4.48) <sup>†</sup>	3.2	1.93 (1.59-2.35) <sup>†</sup>	8.8	2.91 (2.56-3.31) <sup>†</sup>
Heavy episodic drinking						
No	1.3	1.00	1.4	1.00	2.4	1.00
Occasional	4.2	3.38 (2.74-4.18) <sup>†</sup>	2.1	1.49 (1.14-1.93) <sup>†</sup>	5.5	2.33 (1.92-2.84) <sup>†</sup>
Frequent	9.2	7.83 (6.51-9.41) <sup>†</sup>	3.9	2.82 (2.22-3.58) <sup>†</sup>	11.0	4.98 (4.25-5.85) <sup>†</sup>
Use any drug (past year)						
No	1.7	1.00	1.4	1.00	2.7	1.00
Yes	7.5	4.58 (3.88-5.40) <sup>†</sup>	3.7	2.74 (2.22-3.38) <sup>†</sup>	9.5	3.17 (2.72-3.71) <sup>†</sup>

\* $p < .05$ ; <sup>†</sup> $p < .01$ .

drinking schools had 1.5- and 1.8-fold increased odds, respectively, of being raped while intoxicated over those from low-heavy episodic drinking schools. Students attending schools in rural environments, compared with those in nonrural schools, had 1.3-fold increased odds of being raped while intoxicated. Compared with students from the West Region, students from the South and North Central regions had 1.3- and 1.4-fold increased odds, respectively, of being raped while intoxicated. No other college characteristic was a significant risk factor for rape.

Table 3 shows the results on individual risk factors predicting vulnerability to rape. Both rape while intoxicated and other rape were more likely to be reported by underage women. White women were more likely to have experienced rape while intoxicated and less likely to experience other rape. Rape was more likely when students resided in sorority houses (3-fold increased odds) and on-campus dormitories (1.4-fold increased odds) than when they lived off-campus. This finding may be due to the fact that underage students are more likely to reside in on-campus dormitories than in off-campus lodgings. Sorority membership was also significantly associated with rape while intoxicated (1.7-fold increased odds). Heavy episodic drinking in high school was also significantly related to being raped while intoxi-

cated and other rapes. As expected, heavy episodic drinking in college was the strongest predictor of rape while intoxicated and of other rapes. Frequent heavy episodic drinkers and occasional heavy episodic drinkers were more likely to be raped while intoxicated (7.8-fold increased odds and 3.4-fold increased odds, respectively) and to experience other rape (2.8-fold increased odds and 1.5-fold increased odds, respectively) than nonheavy episodic drinkers were. Women who used drugs, compared with those who did not, had 4.6-fold increased odds of being victims of rape while intoxicated and 2.7-fold increased odds of being victims of other rape.

Table 4 presents the multiple logistic regressions examining the correlates of rape while intoxicated. There were no significant differences among the 3 survey years. After adjusting for other correlates, women from medium- and high-heavy episodic schools had 1.2-fold increased odds of being raped while intoxicated compared with women from low-heavy episodic schools. Being underage (1.3-fold increased odds), residing in a sorority house (2-fold increased odds), heavy episodic drinking in high school (2.5-fold increased odds) and using illicit drugs (3.2-fold increased odds) remained significant risk factors predicting vulnerability to being raped while intoxicated.

TABLE 4. Multiple logistic regression predicting rape while intoxicated (N = 22,941)

	Adjusted OR (95% CI)
College characteristics	
Year	
1997	1.00
1999	0.94 (0.77-1.15)
2001	0.83 (0.67-1.02)
School heavy episodic drinking level	
Low	1.00
Medium and high	1.21 (1.00-1.45)*
Response rate	0.99 (0.98-1.00)
Individual characteristics	
Underage	
No	1.00
Yes	1.31 (1.12-1.53)†
White	
No	1.00
Yes	1.05 (0.86-1.27)
Residence	
Other	1.00
Sorority house	1.95 (1.35-2.80)†
High school heavy episodic drinking	
No	1.00
Yes	2.46 (2.08-2.90)†
Use any drug	
No	1.00
Yes	3.19 (2.65-3.83)†

\* $p < .05$ ; † $p < .01$ .

## Discussion

The present study indicates that 1 in 20 college women experienced rape since the beginning of the school year. Moreover, 72% of these rapes occurred when victims were so intoxicated that they were unable to consent. Certain women are at increased risk of being raped while intoxicated, particularly those who attend colleges with higher levels of heavy episodic drinking and who belong to or live in sororities.

The finding of higher rates of rape among sorority members is worth noting. Although a relatively small proportion of college women in our sample belonged to sororities (13%), they constituted a large group nationally. According to the Panhellenic Conference web page (<http://www.npcwomen.org/>), there are 2,903 undergraduate sorority chapters in the U.S. admitting 76,000 new members each year. Consistent with previous studies on sorority women (Copenhaver and Grauerholz, 1991), our study showed that women who belong to sororities and women who reside in a sorority house are at increased risk for rape while intoxicated and other rape. For college women, joining a sorority places them in a peer group that has selected them because they hold values similar to those of the peer group. It also offers them extensive opportunities to socialize with men who have joined fraternities. Being in a so-

rority thus involves more than joining an organization. It is a marker for a particular peer group and social environment. Previous research (Koss and Gaines, 1993) found that although fraternity membership is predictive of rape in a univariate analysis, in the multivariate context it loses its predictive power when alcohol use is entered. This finding suggests that fraternities attract men who drink more than average, and these higher levels of drinking predict perpetration of sexual aggression. Joining a sorority raises the likelihood one will meet more men who drink heavily compared with other student groups, and, in this heavier drinking context, rape is more likely. The peer group norms in sororities and fraternities are to drink heavily, act in an uninhibited manner and engage in casual sex (Martin and Hummer, 1989; Norris et al., 1996). A previous study based on focus groups (Norris et al., 1996) found that women experience tension between the peer group norms to engage in casual sex and the still existing double standard that premarital sex has different meanings for men and for women. They suggest that women use alcohol to relieve this tension and to disinhibit their decision making.

Many sorority women are new to the heavy drinking scene. We found that more than half (59%) of sorority house residents who were not heavy episodic drinkers in high school became heavy episodic drinkers in college, whereas only one in four (28%) women not living in sorority houses did. This finding suggests the sorority house residents who are relatively new to heavy episodic drinking are at increased risk of being raped or forced to have sex while under the influence and unable to refuse. Studies have found that alcohol-related sexual assaults are more likely to occur among college students who know each other only casually and who spend time together at a party or bar (Abbey et al., 1996a; Ullman et al., 1999). Colleges should see to it that fraternities provide more oversight and regulation of their parties to protect their guests and visitors.

College women who are heavy episodic drinkers, were heavy episodic drinkers in high school, use illicit drugs and are under age 21 are more likely to experience rape while intoxicated. As Kilpatrick pointed out, however, heavy alcohol use may be both a cause and a consequence of victimization, in which case it may be initiated or increased in response to psychological distress (Kilpatrick et al., 1997). The present study is a cross-sectional design and cannot establish the direction of the relationship. Although our data did show that heavy episodic drinking in high school is a strong predictor of rape while intoxicated, we did not have information of previous victimization.

As is consistent with previous studies, our results also showed that white college students are more likely than other ethnic groups to experience alcohol-related sexual assaults (Abbey et al., 1996a; Harrington and Leitenberg 1994). White students may be particularly at risk because heavy alcohol use is more common among white college

students (Caetano et al., 1998; Wechsler et al., 1994, 2000, 2002).

The present study indicates that alcohol use is a central factor in most college rapes. Paradoxically, few rape preventive interventions focus on alcohol use. Bachar and Koss (2001) reviewed 15 university-based rape preventive interventions conducted between 1994 and 1999. Only three included references to alcohol use. Similarly, most of the prevention programs that describe responsible drinking do not emphasize sexual assault as a consequence of heavy drinking (Abbey, 2002). The association of rape and intoxication and use of illicit drugs suggests that substance abuse prevention (dealing with potential perpetrators and also with potential victims) should play an important role in rape prevention, targeting in particular underage students. Rape and alcohol abuse prevention efforts can benefit from incorporating information about alcohol's role in different assault contexts (Ullman et al., 1999).

A large number of women have been raped while attending college. College officials need to work on both the primary prevention of rape as well as its secondary and tertiary preventions that minimize its long-term damage to victims. Among the outcomes of being raped is the risk of a future victimization as well as of substance abuse (Kilpatrick et al., 1997). Rape due to intoxication, the most frequent type of rape in college, poses a difficult challenge for prevention. Although efforts against the new "date rape drugs" are necessary, alcohol remains the most widely used date rape drug, surpassing GHB and Rohypnol (Hindmarch and Brinkmann, 1999). College prevention programs must give increased attention to educating the male student that one of the first questions he must ask himself before initiating sex with a woman is whether she is capable of giving consent (Roze and Koss, 2001). College men must be educated for their own protection that intoxication is a stop sign for sex (Abbey, 2002; Biden, 2000). College women need to be warned not only about the loss of control through heavy drinking but also about the extra dangers imposed in situations where many people are drinking heavily. The person who commits rape is, of course, responsible in both the legal and the moral sense, and we must view rape from that perspective. For purposes of prevention, however, identifying the factors that place women at increased vulnerability to rape is also important.

The results of this study must be viewed within the context of its limitations.

First, the CAS is subject to the limitations of self-report surveys. Such surveys, however, have been widely used and are considered generally valid in examining alcohol-related responses (Cooper et al., 1981; Midanik, 1998) and sexual victimization (Koss, 1992, 1996).

Second, the boundaries of time within which rape occurred were defined by the phrase "since the beginning of the school year" and may vary somewhat across campuses

because questionnaires were mailed to schools between February and April and returned between February and June. However, we examined whether the report of each type of rape differed on the basis of the time we received the questionnaires and found no significant differences in school rates of rape. The time frame of the heavy episodic drinking measure, moreover, did not coincide with the time frame of rape measures. The direction of the association of rape and drinking is therefore undetermined, and the findings of the present study should be interpreted with caution. Furthermore, the present study did not collect information about alcohol use by perpetrators, although previous studies have shown that 100% of the incidents in which the victim was drinking involved perpetrator drinking (Ullman and Brecklin, 2000).

Third, potential bias may have been introduced through nonresponse. Several procedures, however, were used to test for potential bias from nonresponse and found it to have no effect on the findings. In addition, the heavy episodic drinking rates reported in this study are almost identical to those found in other national surveys (Centers for Disease Control and Prevention, 1997; Johnston et al., 1999; Presley et al., 1996; Substance Abuse and Mental Health Services Administration, 2000) as are tobacco use rates (Centers for Disease Control and Prevention, 1999a,b) and illicit drug use rates (Substance Abuse and Mental Health Services Administration, 2000).

### Acknowledgments

The authors gratefully acknowledge the Center for Survey Research of the University of Massachusetts-Boston and Dr. Anthony M. Roman for conducting the mail survey, Jeff Hansen for preparation of the data, Dr. Hang Lee for statistical consulting, Mark Seibring and Karen Powers for editorial comment and Lisa T. Irish for assistance in manuscript preparation.

### References

- ABBEY, A. Alcohol-related sexual assault: A common problem among college students. *J. Stud. Alcohol*, Supplement No. 14, pp. 118-128, 2002.
- ABBEY, A., ROSS, L.T., McDUFFIE, D. AND MCAUSLAN, P. Alcohol and dating risk factors for sexual assault among college women. *Psychol. Women Q.* **20**: 147-169, 1996a.
- ABBEY, A., ROSS, L.T., McDUFFIE, D. AND MCAUSLAN, P. Alcohol, misperception, and sexual assault: How and why are they linked? In: BUSS, D.M. AND MALAMUTH, N.M. (Eds.) *Sex, Power, Conflict: Evolutionary and Feminist Perspectives*, New York: Oxford Univ. Press, 1996b, pp. 138-161.
- ABBEY, A., ZAWACKI, T., BUCK, P.O., TESTA, M., PARKS, K., NORRIS, J., MARTIN, S.E., LIVINGSTON, J.A., MCAUSLAN, P., CLINTON, M.A., KENNEDY, C.L., GEORGE, W.H., DAVIS, K.C. AND MARTELL, J. How does alcohol contribute to sexual assault? Explanations from laboratory and survey data. *Alcsm Clin. Exp. Res.* **26**: 575-581, 2002.
- BACHAR, K. AND KOSS, M.P. From prevalence to prevention: Closing the gap between what we know about rape and what we do. In: RENZETTI, C.M., EDELSON, J.L. AND BERGEN, R.K. (Eds.) *Sourcebook of Violence against Women*, Thousand Oaks, CA: Sage, 2001, pp. 117-142.

- BERKOWITZ, A. College men as perpetrators of acquaintance rape and sexual assault: A review of recent research. *J. Amer. Coll. Hlth* **40**: 175-181, 1992.
- BIDEN, J.R., JR. Excessive Drinking on America's College Campuses, Washington, DC: Youth Violence Subcommittee, United States Senate Judiciary Committee, 2000.
- BROWN, S.A., GOLDMAN, M.S., INN, A. AND ANDERSON, L.R. Expectations of reinforcement from alcohol: Their domain and relation to drinking patterns. *J. Cons. Clin. Psychol.* **48**: 419-426, 1980.
- CAETANO, R., CLARK, C.L. AND TAM, T. Alcohol consumption among racial/ethnic minorities: Theory and research. *Alcohol Hlth Res. World* **22**: 233-241, 1998.
- CENTERS FOR DISEASE CONTROL AND PREVENTION. Youth Risk Behavior Surveillance: National College Health Risk Behavior Survey United States. *MMWR* **46** (SS-6): 1-56, 1997.
- CENTERS FOR DISEASE CONTROL AND PREVENTION. Tobacco Use: United States, 1900-1999. *MMWR* **48** (43): 986-993, 1999a.
- CENTERS FOR DISEASE CONTROL AND PREVENTION. Cigarette Smoking among Adults: United States, 1997. *MMWR* **48** (43): 993-996, 1999b.
- COOPER, A.M., SOBELL, M.B., SOBELL, L.C. AND MAISTO, S.A. Validity of alcoholics' self-reports: Duration data. *Int. J. Addict.* **16**: 401-406, 1981.
- COPENHAVER, S. AND GRAUERHOLZ, E. Sexual victimization among sorority women: Exploring the link between sexual violence and institutional practices. *Sex Roles* **24** (1-2): 31-41, 1991.
- DEPARTMENT OF EDUCATION. Fall Enrollment Survey, Washington, DC: Integrated Postsecondary Education Data System, National Center for Education Statistics, 1997.
- FISHER, B.S., CULLEN, F.T. AND TURNER, M.G. The Sexual Victimization of College Women, Washington, DC: Bureau of Justice Statistics, Department of Justice, 2000.
- GEORGE, W.H. AND NORRIS, J. Alcohol, disinhibition, sexual arousal, and deviant sexual behavior. *Alcohol Hlth Res. World* **15**: 133-138, 1991.
- GIDYCYZ, C.A., HANSON, K. AND LAYMAN, M.J. A prospective analysis of the relationships among sexual assault experiences: An extension of previous findings. *Psychol. Women Q.* **19**: 5-29, 1995.
- HARRINGTON, N.T. AND LEITENBERG, H. Relationship between alcohol consumption and victim behaviors immediately preceding sexual aggression by acquaintance. *Viol. Vict.* **9**: 315-324, 1994.
- HINDMARCH, I. AND BRINKMANN, R. Trends in the use of alcohol and other drugs in cases of sexual assault. *Human Psychopharmacol. Clin. Exp.* **14**: 225-231, 1999.
- JOHNSTON, L.D., O'MALLEY, P.M. AND BACHMAN, J.G. National Survey Results on Drug Use from the Monitoring the Future Study, 1975-1998, Vol. 2, NIH Publication No. 99-4661, Washington: Government Printing Office, 1999.
- KILPATRICK, D.G., ACIERNO, R., RESNICK, H.S., SAUNDERS, B.E. AND BEST, C.L. A 2-year longitudinal analysis of the relationships between violent assault and substance use in women. *J. Cons. Clin. Psychol.* **65**: 834-847, 1997.
- KOSS, M.P. Hidden rape: Sexual aggression and victimization in a national sample of students in higher education. In: BURGESS, A.W. (Ed.) *Rape and Sexual Assault II*, New York: Garland, 1988, pp. 3-25.
- KOSS, M.P. The underdetection of rape: Methodological choices influence incidence estimates. *J. Social Issues* **48**: 61-75, 1992.
- KOSS, M.P. The measurement of rape victimization in crime surveys. *Crim. Justice Behav.* **23**: 55-69, 1996.
- KOSS, M.P. AND GAINES, J.A. The prediction of sexual aggression by alcohol use, athletic participation, and fraternity affiliation. *J. Interpers. Viol.* **8**: 94-108, 1993.
- KOSS, M.P., GIDYCYZ, C.A. AND WISNIEWSKI, N. The scope of rape: Incidence and prevalence of sexual aggression and victimization in a national sample of higher education students. *J. Cons. Clin. Psychol.* **55**: 162-170, 1987.
- LIANG, K.Y. AND ZEGAR, S.L. Longitudinal data analysis using generalized linear models. *Biometrika* **73**: 13-22, 1986.
- MALAMUTH, N.M. AND BRIERE, J. Sexual violence in the media: Indirect effects on aggression against women. *J. Social Issues* **42**: 75-92, 1986.
- MARTIN, P.Y. AND HUMMER, R.A. Fraternities and rape on campus. *Gender Society* **3**: 457-473, 1989.
- MARX, B.P., NICHOLS-ANDERSON, C., MESSMAN-MOORE, T., MIRANDA, R., JR. AND PROTER, C. Alcohol consumption, outcome expectancies, and victimization status among female college students. *J. Appl. Social Psychol.* **30**: 1056-1070, 2000.
- MIDANIK, L. Validity of self-reported alcohol use: A literature review and assessment. *Brit. J. Addict.* **83**: 1019-1029, 1988.
- MILLS, C.S. AND GRANOFF, B.J. Date and acquaintance rape among a sample of college students. *Social Work* **37**: 504-509, 1992.
- MUEHLENHARD, C.L. AND LINTON, M.A. Date rape and sexual aggression in dating situations: Incidence and risk factors. *J. Counsel. Psychol.* **34**: 186-196, 1987.
- NORRIS, J., NURIUS, P.S. AND DIMEFF, L.A. Through her eyes: Factors affecting women's perception of and resistance to acquaintance sexual aggression threat. *Psychol. Women Q.* **20**: 123-145, 1996.
- PRESLEY, C.A., MEILMAN, P.W. AND CASHIN, J.R. Alcohol and Drugs on American College Campuses: Use, Consequence, and Perceptions of the Campus Environment, Vol. IV: 1992-1994, Carbondale, IL: Core Institute, Southern Illinois University, 1996.
- PRESLEY, C.A., MEILMAN, P.W., CASHIN, J.R. AND LEICHLITER, J.S. Alcohol and Drugs on American College Campuses: Issues of Violence and Harassment, Carbondale, IL: Core Institute, Southern Illinois University, 1997.
- RAO, J.N.K. AND SCOTT, A.J. On chi-squared tests for multiway contingency tables with cell proportions estimated from survey data. *Annual Stat.* **12**: 46-60, 1984.
- ROZEE, P.D. AND KOSS, M.P. Rape: A century of resistance. *Psychol. Women Q.* **25**: 295-311, 2001.
- SCULLY, D. Understanding Sexual Violence: A Study of Convicted Rapists, Boston, MA: Unwin Hyman Press, 1990.
- STATA CORP. Stata Statistical Software: Release 7.0, College Station, TX: Stata Corp., 2001.
- SUBSTANCE ABUSE AND MENTAL HEALTH SERVICES ADMINISTRATION (Office of Applied Studies). Summary of Findings from the 1999 National Household Surveys on Drug Abuse, DHHS Publication No. (SMA) 00-3466, Rockville, MD: Department of Health and Human Services, 2000.
- TESTA, M. The impact of men's alcohol consumption on perpetration of sexual aggression. *Clin. Psychol. Rev.* **22**: 1239-1263, 2002.
- TJADEN, P. AND THOENNES, N. Prevalence and consequences of male-to-female and female-to-male intimate partner violence as measured by the National Violence Against Women Survey. *Viol. Women* **6**: 142-161, 2000.
- ULLMAN, S.E. AND BRECKLIN, L.R. Alcohol and adult sexual assault in a national sample of women. *J. Subst. Abuse* **11**: 405-420, 2000.
- ULLMAN, S.E., KARABATSOS, G. AND KOSS, M.P. Alcohol and sexual assault in a national sample of college women. *J. Interpers. Viol.* **14**: 603-625, 1999.
- WECHSLER, H. AND AUSTIN, S.B. Binge drinking: The five/four measure (correspondence). *J. Stud. Alcohol.* **59**: 122-123, 1998.
- WECHSLER, H., DAVENPORT, A., DOWDALL, G., MOEYKENS, B. AND CASTILLO, S. Health and behavioral consequences of binge drinking at colleges: A national survey of students at 140 campuses. *JAMA.* **272**: 1672-1677, 1994.
- WECHSLER, H., DOWDALL, G.W., DAVENPORT, A. AND RIMM, E.B. A gender-specific measure of binge drinking among college students. *Amer. J. Publ. Hlth* **85**: 982-985, 1995a.
- WECHSLER, H., LEE, J.E., KUO, M. AND LEE, H. College binge drinking in the 1990s: A continuing problem. Results of the Harvard School of Public Health 1999 College Alcohol Study. *J. Amer. Coll. Hlth* **48**: 199-210, 2000.



- WECHSLER, H., LEE, J.E., KUO, M., SEIBRING, M., NELSON, T.F. AND LEE, H. Trends in college binge drinking during a period of increased prevention efforts. Findings from 4 Harvard School of Public Health College Alcohol Study Surveys: 1993-2001. *J. Amer. Coll. Hlth* **50**: 203-217, 2002.
- WECHSLER, H., MOEYKENS, B., DAVENPORT, A., CASTILLO, S. AND HANSEN, J. The adverse impact of heavy episodic drinkers on other college students. *J. Stud. Alcohol* **56**: 628-634, 1995b.
- WECHSLER, H. AND NELSON, T.F. Binge drinking and the American college student: What's five drinks? *Psychol. Addict. Behav.* **15**: 287-291, 2001.
- WHITE, J.W. AND KOSS, M.P. Courtship violence: Incidence in a national sample of higher education students. *Viol. Vict.* **6**: 247-256, 1991.
- ZEGAR, S.L., LIANG, K.Y. AND ALBERT, P.S. Models for longitudinal data: A generalized estimating equation approach. *Biometrics* **44**: 1049-1060, 1988.