Published in final edited form as:
Addict Behav. 2011 December ; 36(12): 1353–1356. doi:10.1016/j.addbeh.2011.07.037.

Differential prevalence of alcohol use among 2-year and 4-year college students

Cayley E. Velazquez, MS, RD[a], **Keryn E. Pasch, PhD, MPH**[a], **Melissa N. Laska, PhD, RD**[b], **Katherine Lust, PhD, MPH, RD**[c], **Mary Story, PhD, RD**[b], and **Edward P. Ehlinger, MD, MSPH**[c,d]

[a]Department of Kinesiology and Health Education, University of Texas, Austin, TX

[b]Division of Epidemiology and Community Health, University of Minnesota, Minneapolis, MN

[c]Boynton Health Service, University of Minnesota, Minneapolis, MN

Abstract

Purpose—To determine whether alcohol use behaviors and alcohol-related consequences differed among students attending two-year versus four-year colleges.

Methods—Participants (N=13,700) from 7 two-year and 11 four-year colleges completed the 2010 College Student Health Survey. Alcohol use behaviors included past year alcohol use, past month alcohol use, and binge drinking over the past two weeks. Alcohol-related factors included average calculated blood alcohol level and average number of alcohol-related consequences. Cross-sectional mixed-effects regression analyses were conducted to determine if the prevalence of alcohol-related behaviors and consequences differed among two-year and four-year colleges.

Results—Students attending four-year colleges, particularly males, were more likely to report past year alcohol use, past month alcohol use, and binge drinking, as well as a higher average blood alcohol content and a greater number of alcohol-related consequences than their two-year counterparts ($p<0.05$). Among female students there were fewer differences between two-year and four-year college students. Many differences remained after adjusting for socio-demographic

Correspondence concerning this article should be addressed to Keryn E. Pasch, Ph.D., M.P.H. Department of Kinesiology and Health Education, University of Texas at Austin, 1 University Station, D3700, Austin, TX 78712. kpasch@mail.utexas.edu, Phone: 512-232-8295.

[d]Current Affiliation: Minnesota Department of Health, St. Paul, MN

Cayley E. Velazquez, MS, RD., University of Texas at Austin, Department of Kinesiology and Health Education, 1 University Station, D3700, Austin, TX 78712, cayleywarner@mail.utexas.edu

Melissa N. Laska, PhD, RD., University of Minnesota, Department of Epidemiology and Community Health, 1300 South Second Street, Suite 300, Minneapolis, MN 55454, mnlaska@umn.edu

Katherine Lust, PhD, MPH, RD., Director of Research, University of Minnesota, Boynton Health Service, 410 Church Street S.E., N217, Minneapolis, MN 55455, klust@bhs.umn.edu

Mary Story, PhD, RD., Professor, Division of Epidemiology and Community Health, Associate Dean for Student Life, School of Public Health, University of Minnesota, 1300 S 2nd St., Suite 300, Minneapolis, MN 55454, story@epi.umn.edu

Edward P. Ehlinger, MD, MSPH., Commissioner, Minnesota Department of Health, 625 Robert St. N, P.O. Box 64975, St. Paul, MN 55164-0975, ed.ehlinger@state.mn.us

Melissa Nelson Laska, Katherine Lust, Ed Ehlinger, and Mary Story designed the study, developed the questionnaire, and implemented the study. Cayley Velazquez and Keryn Pasch conducted the statistical analysis. Cayley Velazquez wrote the first draft of the manuscript and all authors contributed to and have approved the final manuscript.

All authors declare that they have no conflicts of interest.

factors (e.g., age, race/ethnicity), however, with the addition of living situation as a covariate, several of the differences among males were no longer significant.

Conclusions—Significant differences in alcohol-related behaviors and consequences exist among students attending two-year versus four-year colleges. While the prevalence of alcohol-related behaviors and consequences was lower among two-year college students, they are not a population to be over-looked. The prevalence of alcohol use remains high among both two-year and four-year college students, making it important for researchers to design appropriate interventions for all students regardless of the type of institution being attended.

Keywords

Alcohol use; emerging adulthood; college youth

Introduction

Emerging adulthood is a distinct developmental period between the ages of 18 and 25 (Arnett, 2000). Life changes that occur during this time allow for individual growth and independence, however, risk behaviors tend to peak (Park, Mulye, Adams, Brindis, & Irwin, 2006). Because a large number of emerging adults enroll in post-secondary institutions, these settings provide an opportune location in which to promote healthy lifestyle behaviors. However, research among emerging adults tends to be conducted with traditional four-year students, resulting in a shortage of literature on health-related behaviors of individuals attending two-year colleges (Nelson, Story, Larson, Neumark-Sztainer, & Lytle, 2008).

Changes in health risk behaviors, such as alcohol use, occur during emerging adulthood. In 2008, 69.0% of US college students, including those at both two-year and four-year institutions, reported using alcohol in the past month (Johnston, O'Malley, Bachman, & Schulenberg, 2009). The prevalence rate of binge drinking (i.e., having five or more drinks in one sitting) among male college students has remained relatively stable in recent years (Wechsler et al., 2002) (Johnston, et al., 2009); however, binge drinking among young women may be increasing (Tsai, Floyd, & Bertrand, 2007).

Research also suggests that extreme binge drinking is problematic, with 11% of students consuming 10 or more drinks and 5% consuming 15 or more drinks in a row (Johnston, et al., 2009). In addition, many individuals experience negative consequences after drinking. In fact, among college students who have used alcohol, almost one-third (31.4%) report doing something regrettable, 26.8% report forgetting where they were or what they did, and 15.1% report physically injuring themselves (American College Health Association, 2010).

Although much research has focused on alcohol use and its related consequences among traditional four-year students, minimal research exists for individuals attending other types of institutions, such as two-year colleges. The purpose of this study was to determine whether the prevalence of alcohol use behaviors and consequences differed among students attending two-year and four-year colleges in a large statewide surveillance system of post-secondary institutions.

Material and Methods

Data for this cross-sectional study were from the 2010 College Student Health Survey, an online survey conducted by Boynton Health Service at the University of Minnesota. The sampling frame consisted of students from 18 Minnesota post-secondary campuses (seven two-year colleges, eleven four-year colleges). Of the eleven four-year schools, nine were public and two were private. Enrollment ranged from 387 to 45,881 students, schools were

located in metropolitan, small urban and rural locations throughout the state, and all regions of Minnesota were represented. Further details are available online (http://www.bhs.umn.edu/surveys/index.htm). In total, 34,097 students were randomly selected to participate, with a final sample of 13,700 students (response rate: 40.2%). The University of Minnesota Institutional Review Board approved all study protocols.

1.1 Measures

Demographic Factors—Demographics were self-reported. Gender was denoted as male, female, or transgender/other. Students identified their race/ethnicity (i.e., American Indian/Alaskan Native, Asian/Pacific Islander, Black-Not Hispanic, Latino/Hispanic, White-Not Hispanic, Other). Relationship status included: single, married/domestic partner, separated, widowed, divorced, or engaged/committed dating relationship. Number of dependent children ranged from 0 to 6 or more, and weekly hours worked for pay, a composite of hours worked on- and off-campus, ranged from 0 to >40 hours. Living situation included: parent's home, rent/share rent, residence hall, fraternity/sorority, public/subsidized housing, own a house, and other.

Alcohol Use—Past year alcohol use was measured by asking, "During the past 12 months, how often have you used: alcohol (beer, wine, liquor)?" ("did not use" to "more than once/month"). Past month alcohol use was measured by asking, "During the past 30 days, on how many days did you use: alcohol (beer, wine, liquor)?" (range 0–30 days). Binge drinking was obtained by asking students to report how many times they consumed five or more drinks in a sitting over the past two weeks ("do not drink" to "10 or more times"). All alcohol use behaviors were dichotomized as 0 and 1 to indicate no use versus any use.

Alcohol-Related Factors—Blood alcohol level (BAL) was calculated based on a formula that accounted for: gender, current body weight, number of drinks consumed, time period of consumption, and concentration of alcohol (based on the alcohol content of one typical can of beer containing 4.5% alcohol). Students self-reported how often they experienced consequences due to their drinking or drug use during the past year from a list of 19 items (e.g., had a hangover, performed poorly on a test). Response options were "never" "once" "twice" "3–5 times" "6–9 times" and "10 or more times." Each response option was recoded to the mid-point and a composite score was created to measure total alcohol-related consequences (range 0–190). A higher score indicates more negative consequences.

1.2 Analysis

Differences in the distribution of socio-demographic characteristics between two-year and four-year students were assessed by gender. Cross-sectional mixed-effects regression analyses were conducted to determine whether the prevalence of alcohol use behaviors and consequences differed among students attending two-year and four-year colleges. Model 1 controlled for age, race/ethnicity, relationship status, dependent children, and weekly hours worked for pay, while model 2 controlled for the same socio-demographic variables, with the addition of living situation. Because students were nested within schools, schools were specified as the random effect in the models (Raudenbush & Bryk, 2002). Models were gender-stratified given the differences in alcohol use behaviors among college-age individuals (Johnston, et al., 2009). Given age-related differences in alcohol use (Johnston, et al., 2009), a second set of analyses were conducted using only 18–25 year olds (n=10,503). Models were also run to determine whether alcohol-related consequences differed by binge-drinking status. For BAL and alcohol-related consequences, models were run using the non-transformed and the square root-transformed dependent variable, using the

p-value from the transformed measure and the estimate from the non-transformed measure to improve interpretability.

Participants with missing data for age (n=56) or gender (n=29), or who self-identified as transgendered (n=13) were excluded, resulting in a final sample of 13,622. Outcome variables ranged in missingness from 0.1% for BAL to 0.9% for alcohol-related consequences; therefore, sample sizes for individual models vary slightly. Data were analyzed using SAS version 9.2 (SAS Institute Inc., 2009).

Results

Differences between two-year and four-year student status were observed for age, relationship status, number of dependent children, weekly hours worked for pay, and living situation ($p<0.05$) (Table 1). In general, when compared to two-year students, four-year students were younger, more likely to be single, more likely to live on campus, less likely to have 1 dependent child, and more likely to work fewer hours for pay.

Differences in alcohol-related factors by student status are shown in Table 2. Among two-year students, 62.7% of females and 62.6% of males reported past month alcohol use, compared to 69.4% of females and 71.0% of males in four-year colleges. Unadjusted models suggested that females attending four-year colleges were significantly more likely to report a higher prevalence of binge drinking and a greater number of alcohol-related consequences than their two-year counterparts ($p<0.05$). For males, unadjusted analyses indicate that students attending four-year colleges had a higher prevalence of past year alcohol use, past month alcohol use, and binge drinking, as well as a higher BAL and a greater number of alcohol-related consequences than males attending two-year colleges ($p<0.05$).

After controlling for age, race/ethnicity, relationship status, dependent children, weekly hours worked for pay, and living situation, past year and past month alcohol use became significant ($p<0.05$) among females (adjusted models 1 and 2). However, differences in binge drinking and average number of alcohol-related consequences were no longer significant (adjusted models 1 and 2). For males, differences in binge drinking were no longer significant, while all other models remained significant (adjusted model 1). After accounting for living status, (adjusted model 2), none of the models were significant among males.

Among 18–25 year olds, findings were similar to the full sample, in that four-year male students reported greater alcohol use behaviors. Of specific interest is the finding that the prevalence of binge drinking among 18–25 year old males attending four-year colleges was significantly higher than that of their two-year counterparts, as this was not the case in the full sample (adjusted model 1).

Additional analyses to determine whether students engaging in binge drinking experienced more alcohol-related consequences also indicated that binge drinkers reported a significantly greater number of alcohol-related consequences than non-binge drinkers. Female binge drinkers experienced an average of 17 consequences versus only 5 for those reporting no binge drinking ($p<0.0001$). Male binge drinkers experienced an average of 17 consequences versus 4 for non-binge drinkers ($p<0.0001$).

Discussion

This study suggests that significant differences in alcohol use behaviors and consequences exist among students attending two-year versus four-year colleges. For example, males attending four-year colleges were significantly more likely than their two-year counterparts

to report past year and/or past month alcohol use, as well as a higher BAL and a greater number of alcohol-related consequences (adjusted model 1). Among females, fewer differences were observed; however, four-year students were more likely to engage in past year and past month alcohol use (adjusted model 1). Although female students differed on items measuring typical frequency of alcohol use, measures of binge drinking and other alcohol-related factors were not significantly different, suggesting that despite four-year females drinking more than two-year females, there are no differences in heavy drinking across the two groups.

Many of the differences in alcohol-related factors remained or became significant after controlling for socio-demographic factors (e.g., age, race/ethnicity) across the two groups (adjusted model 1), for example, past year and past month alcohol use among females. However, with the addition of living situation (adjusted model 2), several of these differences among males were no longer significant. Perhaps because living situation varies so considerably by two-year and four-year students these models reflect the co-linearity of school status and living situation. Thus, it is difficult to know whether the study findings are due to school type or living situation.

While research examining alcohol use behaviors among four-year students is abundant, studies among two-year students are limited. Sheffield and colleagues (2005) documented binge drinking rates among community college students and determined the prevalence of binge drinking to be 25%, slightly lower than what has been suggested for traditional four-year students. However, similar to findings from the present study, the prevalence of binge drinking among 18–21 year olds was higher (33%), and more in line with the prevalence typically observed on four-year campuses (Sheffield, Darkes, Del Boca, & Goldman, 2005). Thus, additional work that explores other factors which may differ between these students (e.g., how campus environments contribute to alcohol use) is needed.

The prevalence of binge drinking among 18–25 year old males at four-year institutions was significantly higher than that of their two-year counterparts (adjusted model 1), which may be related to the increased presence of fraternity/sorority systems on four-year campuses, some of which may promote excessive alcohol use behaviors. Moreover, as Carter and colleagues note, discretionary time tends to be greater for traditional college students (Carter, Brandon, & Goldman, 2010). Thus, differences in binge drinking may be related to the amount of time available to students to participate in social activities, particularly given the variation in outside responsibilities that can be seen for these students (Carter, et al., 2010). Additionally, it is possible that individual differences are at play, as students may choose their school (i.e., four-year college with a party reputation) or their living situation (i.e., on- or off-campus), based on personality type (Carter, et al., 2010), which may explain differences in binge drinking rates.

Data suggest that 15.2% of adults report binge drinking, with rates highest among individuals between 18–24 years (25.6%) (Center for Disease Control and Prevention, 2010). In addition, many young people who engage in such behavior report having experienced numerous alcohol-related problems (Wechsler, Lee, Kuo, & Lee, 2000). Evidence also suggests that students attending two-year schools encounter alcohol-related problems as well. Coll (1999) found that among two-year students, 31% reported driving after drinking, 15% had missed class because of a hangover, and 7% had been in a physical fight after using alcohol (Coll, Shott, & Morris, 1999). Although findings from the present study suggest that both two-year and four-year students experience alcohol-related consequences, four-year students tended to report a greater number of consequences. Moreover, particularly among females, it is possible that students at four-year campuses have significantly fewer responsibilities (i.e. care of children) than students at two-year

campuses and thus may be able to engage in alcohol use behaviors without regard to the resulting consequences. Regardless, findings from this study suggest that binge drinkers experience a greater number of alcohol-related consequences than non-binge drinkers, despite school status.

Strengths of this study include a large sample size from a diverse range of locations from across the state, however, limitations exist. Most notably, generalizability of these findings may be limited given that most participants were Caucasian and from one state. Moreover, given the response rate, it is possible that students who chose not to participate in the current study have different alcohol use behaviors than those who did respond. The findings are also limited to students enrolled in post-secondary institutions. Future research should explore the prevalence of alcohol use among emerging adults not enrolled in such institutions.

Emerging adulthood is a time in which lasting health behaviors may be formed, but much of the research on this time period has focused on traditional four-year college students. This study suggests that while the prevalence of alcohol use behaviors and consequences is lower among two-year students, they are not a population to be ignored. The prevalence of past month alcohol use remains high among two-year college students, with more than 60% reporting past month alcohol use, making it important for researchers to design interventions for all students regardless of institution type. Research which examines differences on alcohol use behaviors based on school type is important, however, future research should consider the influence of individual and environmental characteristics on such outcomes, especially given the considerable variation in the responsibilities of two-year and four-year students.

Acknowledgments

Partial funding was provided by a 2008 congressionally directed grant award to the Minnesota State Colleges and Universities (P116Z080299). The U.S. Department of Education had no role in the study design, collection, analysis or interpretation of the data, writing the manuscript, or the decision to submit the paper for publication. The results do not necessarily represent the policy of the U.S. Department of Education nor imply endorsement by the federal government. Additional salary support for Dr. Laska was provided by National Cancer Institute Award K07CA126837. The views expressed in this article are those of the authors and do not necessarily reflect the position or policy of the National Cancer Institute.

References

American College Health Association. American College Health Association National College Health Assessment II: Reference Group Data REport Fall 2009. Baltimore, MD: American College Health Association; 2010.

Arnett JJ. Emerging adulthood. A theory of development from the late teens through the twenties. American Psychologist. 2000; 55(5):469–480. [PubMed: 10842426]

Carter AC, Brandon KO, Goldman MS. The College and Noncollege Experience: A Review of the Factors That Influence Drinking Behavior in Young Adulthood. Journal of Studies on Alcohol and Drugs. 2010; 71(5):742–750. [PubMed: 20731981]

Center for Disease Control and Prevention. Vital Signs: Binge Drinking Among High School Students and Adults - United States, 2009. Morbidity & Mortality Weekly Report. 2010; 59:1274–1279. [PubMed: 20930706]

Coll KM, Shott D, Morris J. An assessment of drinking patterns and drinking problems among community college students: Implications for programming. Journal of College Student Development. 1999; 40(1):98–100.

Johnston, LD.; O'Malley, PM.; Bachman, JG.; Schulenberg, JE. Secondary school students. Vol. 1. Bethesda, MD: National Institute on Drug Abuse; 2009. Monitoring the Future national survey results on drug use, 1975–2008.

Nelson MC, Story M, Larson NI, Neumark-Sztainer D, Lytle LA. Emerging adulthood and college-aged youth: an overlooked age for weight-related behavior change. Obesity (Silver Spring). 2008; 16(10):2205–2211. [PubMed: 18719665]

Park MJ, Mulye TP, Adams SH, Brindis CD, Irwin CE. The health status of young adults in the United States. Journal of Adolescent Health. 2006; 39(3):305–317. [PubMed: 16919791]

Raudenbush, SW.; Bryk, AS. Hierarchical linear models: Applications and data analysis methods. 2. Thousand Oaks: Sage Publications; 2002.

SAS Institute Inc. SAS for Window 9.2. 2009.

Sheffield FD, Darkes J, Del Boca FK, Goldman MS. Binge drinking and alcohol-related problems among community college students: Implications for prevention policy. Journal of American College Health. 2005; 54(3):137–141. [PubMed: 16335480]

Tsai J, Floyd RL, Bertrand J. Tracking binge drinking among US childbearing-age women. Preventive Medicine. 2007; 44(4):298–302. [PubMed: 17150249]

Wechsler H, Lee JE, Kuo M, Seibring M, Nelson TF, 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. (vol 50, pg 203, 2002). Journal of American College Health. 2002; 51(1):37–37.

Wechsler H, Lee JE, Kuo MC, Lee H. College binge drinking in the 1990s: A continuing problem - Results of the Harvard School of Public Health 1999 College Alcohol Study. Journal of American College Health. 2000; 48(5):199–210. [PubMed: 10778020]

Research Highlights

- We examine the prevalence of alcohol use among two- and four-year college students.
- Alcohol use differs among two- versus four-year colleges, particularly among males.
- The prevalence of alcohol use is high for both two- and four-year college students.
- Appropriate interventions for all students are needed regardless of institution.

Table 1

Socio-demographic characteristics of two-year and four-year post-secondary students attending Minnesota colleges and universities, 2009–2010.

	Female Two- year (n=2,032)	Female Four- year (n=6,340)	Male Two- year (n=1,055)	Male Four- year (n=4,195)
Age				
Mean years (SE)	28.4 (0.9) *	22.7 (0.7) *	26.7 (1.0) *	23.1 (0.8) *
Race/ethnicity				
African American/Black, %	2.1	1.7	4.5 *	2.1 *
American Indian/Alaskan Native, %	0.6	0.9	1.1	0.5
Asian/Pacific Islander, %	3.2	5.4	4.9	7.3
Latino/Hispanic, %	1.6	1.7	1.9	1.6
White/Caucasian, %	96.9	95.9	96.6	96.6
Other/mixed race, %	1.7	1.8	1.6	2.4
Relationship status				
Single, %	29.9 *	46.7 *	47.2 *	55.1 *
Married/domestic partner, %	27.3 *	11.9 *	23.9 *	12.0 *
Engaged/committed relationship, %	37.0	40.7	28.1 *	33.1 *
Separated, widowed or divorced, %	5.6 *	1.0 *	1.1	0.8
Living Arrangement				
On-Campus, %	1.4 *	36.0 *	3.7 *	34.1 *
Off-Campus (parents), %	27.0 *	7.8 *	38.2 *	7.2 *
Off-Campus (rent), %	36.1	41.3	30.7	43.9
Off-Campus (own), %	30.1 *	11.6 *	23.1 *	11.3 *
Other, %	5.5 *	3.2 *	4.3	3.4
Dependent children				
None, %	63.3 *	90.6 *	80.0 *	91.0 *
One or more, %	36.7 *	9.4 *	20.0 *	9.0 *
Weekly hours worked for pay				
Mean hours (SE)	16.6 (1.3) *	11.9 (1.1) *	14.4 (1.7)	11.4 (1.4)

* $p<0.05$

Table 2

Prevalence estimates for alcohol use behaviors and consequences among students attending two- and four-year Minnesota post-secondary institutions (2009–2010).

	Females (n=8,372)					**Males (n= 5,250)**				
	2-year students n=2,032	***4-year students n=6,340***	***p-value (crude) model 1)****	***p-value (adjusted***	***p-value (adjusted model 2)*** +	***2-year students n=1,055***	***4-year students n=4,195***	***p-value (crude)***	***p-value (adjusted model 1)****	***p-value (adjusted model 2)*** +
Alcohol Use										
% past month alcohol use	62.7	69.4	0.06	0.02	0.02	62.6	71.0	0.01	0.004	0.09
% past year alcohol use	78.0	81.0	0.19	0.02	0.03	73.5	79.6	0.02	0.002	0.17
% binge drinking	26.2	31.7	0.05	0.82	0.93	35.9	45.2	0.02	0.09	0.53
Alcohol Related Factors										
Blood alcohol level (SE)	0.07 (0.003)	0.07 (0.003)	0.36	0.82	0.94	0.06 (0.005)	0.07 (0.004)	0.008	0.03	0.44
Mean consequences (SE)	7.2 (0.6)	8.9 (0.5)	0.02	0.94	0.91	7.9 (0.7)	10.5 (0.5)	0.003	0.03	0.09
	18–25 year old Females (n=6,435)					**18–25 year old Males (n= 4,068)**				
	2-year students n=1,118	*4-year students N=5,317*	*p-value (crude) model 1)**	*p-value (adjusted*	*p-value (adjusted model 2)* +	*2-year students n=655*	*4-year students n=3,413*	*p-value (crude)*	*p-value (adjusted model 1)**	*p-value (adjusted model 2)* +
Alcohol Use										
% past month alcohol use	62.9	69.4	0.10	0.003	0.04	58.1	71.5	0.0007	0.0003	0.07
% past year alcohol use	76.9	80.6	0.15	0.002	0.09	69.7	79.9	0.001	0.0005	0.23
% binge drinking	31.9	34.4	0.44	0.22	0.86	38.8	48.6	0.02	0.03	0.54
Alcohol Related Factors										
Blood alcohol level (SE)	0.08 (0.003)	0.08 (0.004)	0.91	0.33	0.92	0.07 (0.004)	0.08 (0.006)	0.004	0.004	0.37
Mean consequences (SE)	9.6 (0.8)	9.9 (0.6)	0.95	0.59	0.92	9.1 (0.8)	11.6 (0.5)	0.007	0.002	0.04

* Models adjusted for age, race/ethnicity, relationship status, dependent children and weekly hours worked for pay.

+ Models adjusted for age, race/ethnicity, relationship status, dependent children, weekly hours worked for pay, and living situation.

Note: Sample sizes for individual analyses vary slightly due to a small degree of missing data.