





Binge Drinking Among Older Adults in the United States, 2015 to 2017

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OBJECTIVES: Binge drinking is a risk factor for a range of harms. This study estimates the national prevalence of binge drinking and adds to our understanding of correlates of binge drinking among older adults in the United States.

DESIGN: Cross-sectional analysis.

SETTING/PARTICIPANTS: A total of 10 927 adults, aged 65 years or older, from the 2015 to 2017 administrations of the US National Survey on Drug Use and Health.

MEASUREMENTS: We estimated the prevalence of past-month binge alcohol use (five or more drinks on the same occasion for men and four or more drinks on the same occasion for women). Characteristics of past-month binge drinkers, including demographics, substance use, serious mental illness, mental health treatment utilization, chronic disease, and emergency department (ED) use, were compared to participants who reported past-month alcohol use without binge drinking. Comparisons were made using χ^2 tests. We then used multivariable generalized linear models using Poisson and log link to examine the association between covariates and binge drinking among all past-month alcohol users aged 65 years or older.

RESULTS: Of 10 927 respondents, 10.6% (95% CI = 9.9%-11.2%) were estimated to be current binge drinkers. Binge drinkers were more likely to be male, have a higher prevalence of current tobacco and/or cannabis use, and have a lower prevalence of two or more chronic diseases compared to nonbinge drinkers. In multivariable analysis, among past-month alcohol users, the prevalence of binge drinking was

higher among non-Hispanic African Americans than whites (adjusted prevalence ratio [aPR] = 1.44; 95% CI = 1.16-1.80), tobacco users (aPR = 1.52; 95% CI = 1.33-1.74), cannabis users (aPR = 1.41; 95% CI = 1.11-1.80), and those who visited the ED in the past year (aPR = 1.16; 95% CI = 1.00-1.33).

CONCLUSION: Over a tenth of older adults in the United States are estimated to be current binge drinkers. Results confirm the importance of screening for binge drinking behaviors among older adults to minimize harms. *J Am Geriatr Soc* 67:2139-2144, 2019.

Key words: alcohol; binge drinking; epidemiology

Alcohol use is increasing among older adults, with concomitant increases in unhealthy alcohol use.^{1,2} From 2001 to 2013, there was a 22.4% increase in past-year alcohol use, a 65.2% increase in high-risk drinking, and a 106.7% increase in alcohol use disorder among adults aged 65 years and older.¹ Another study among adults aged 50 years and older found a 19.2% relative increase in current binge alcohol use from 2005 to 2014.²

Excessive alcohol use, including binge drinking, is a risk factor for a range of health problems, including injury. This is especially true for older adults due to physiological changes related to aging and increasing comorbidity.^{3,4} Binge drinking, even episodically or infrequently, may negatively affect comorbid conditions by exacerbating disease and complicating disease management.⁵

Despite increases in unhealthy alcohol use among older adults and the potential for harm, much remains to be learned about correlates of binge drinking among adults aged 65 years and older. Previously, Blazer and Wu⁶ examined characteristics of binge drinking among adults aged 50 years and older using data from the 2005/2006 US National Survey on Drug Use and Health (NSDUH).⁷ Herein, we update and expand on these analyses to examine the most current national data on binge drinking to determine the recent prevalence of binge drinking among adults aged 65 years and older and identify

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sociodemographic and health-related factors regarding the risk of binge drinking.

METHODS

Data Source and Study Population

Data from adults, aged 65 years and older, surveyed in the 2015, 2016, and 2017 ($n = 10\,927$) NSDUH were analyzed. NSDUH is a cross-sectional survey of non-institutionalized individuals in the 50 US states and the District of Columbia. NSDUH obtained a nationally representative probability sample of individuals obtained through four stages. Surveys were administered via computer-assisted interviewing (conducted by an interviewer) and audio computer-assisted self-interviewing (ACASI). Sample weights were provided by NSDUH to address unit- and individual-level nonresponse. Additional information on sampling and survey methods can be found elsewhere.⁸ The weighted interview response rates for 2015, 2016, and 2017 were 69.7%, 68.4%, and 67.1%, respectively.

Measures

Participants were asked if they engaged in alcohol use and binge drinking in the past month. NSDUH defined past-month binge alcohol use based on the National Institute on Alcohol Abuse and Alcoholism's (NIAAA's) definition of consuming five or more alcoholic beverages on the same occasion for men and four or more alcoholic beverages on the same occasion for women.⁷

Other covariates included in this analysis were socio-demographic characteristics, including sex, race/ethnicity, annual family income, and marital status. We also included all-cause emergency department (ED) use in the past year. Participants were also asked about past-month tobacco use, cannabis use, and misuse of prescription psychotherapeutic drugs (which includes opioids, benzodiazepines, muscle relaxants, zolpidem, eszopiclone, zaleplon products, barbiturates, and stimulants). NSDUH defines misuse as using a drug in any way not directed by a physician, including use without a prescription, more often, in greater amounts, or longer than the participant was directed to take the drug, or use in any other way a physician did not direct the participant to use the drug.⁷ In addition, NSDUH includes an indicator for serious mental illness (SMI), developed and validated by the National Institute of Mental Health and the Substance Abuse and Mental Health Services Administration based on responses to questions in NSDUH.⁹ The items include level of emotional distress, functional impairment, suicidal thoughts, and major depression with SMI roughly equivalent to a Global Assessment of Functioning score of less than 60.⁹ Also included in this analysis was past-year mental health treatment. Finally, participants were asked if they had ever been informed by a physician or other medical professional that they have ever had the following medical diseases: cardiovascular disease, diabetes, chronic obstructive pulmonary disease, cirrhosis of the liver, hepatitis B or C, kidney disease, asthma, hypertension, and cancer. To examine medical multimorbidity, we further coded these indicators into two or more chronic conditions.

Statistical Analysis

We characterized differences in the above covariates between three groups of adults aged 65 years and older: (1) no past-month alcohol use, (2) past-month alcohol use without binge drinking, and (3) past-month binge drinking. Comparisons were made using the χ^2 test between those reporting binge drinking and those reporting alcohol use without binge drinking. A multivariable generalized linear model using Poisson and log link was used to examine the association between covariates and past-month binge drinking among past-month alcohol users, resulting in adjusted prevalence ratios (aPRs) for each covariate. Using Stata SE 13, we included sample weights in all analyses to account for the complex survey design and used imputation-revised variables to limit missing data when available. Secondary analysis of this publicly available data was exempt for review by New York University's Institutional Review Board.

RESULTS

Of 10 927 respondents, 10.6% (95% CI = 9.9%-11.2%) were estimated to be current (past-month) binge drinkers (Table 1). Binge drinkers were more likely to be male, have a higher prevalence of current tobacco and/or cannabis use, and have a lower prevalence of two or more chronic diseases compared to both nondrinkers and those who used alcohol in the past month without binge drinking. Compared to past-month alcohol users who were not binge drinkers, current binge drinkers included a higher proportion of non-Hispanic African Americans (9.5% vs 4.3%; $P < .001$), family incomes less than \$20 000 (13.8% vs 8.0%; $P < .001$), and higher all-cause ED use in the past-year (27.7% vs 23.5%; $P = .04$). The most common chronic disease among binge drinkers was hypertension (41.4%), followed by cardiovascular disease (23.1%) and diabetes (17.7%).

In multivariable analysis (Table 2), among all drinkers aged 65 years and older, the prevalence of binge drinking was higher among non-Hispanic African Americans than among whites (aPR = 1.44; 95% CI = 1.16-1.80) (Table 2). Binge drinking was also more common among tobacco users (aPR = 1.52; 95% CI = 1.33-1.74), cannabis users (aPR = 1.41; 95% CI = 1.11-1.80), and those who visited the ED in the past year (aPR = 1.16; 95% CI = 1.00-1.33). Conversely, the prevalence of binge drinking was lower among females than males (aPR = 0.78; 95% CI = 0.67-0.91), among those with a college education than those with less than a high school education (aPR = 0.57; 95% CI = 0.46-0.71), and among adults with two or more chronic diseases than those with fewer than two chronic diseases (aPR = 0.83; 95% CI = 0.70-0.98).

DISCUSSION

More than a tenth of older adults in the United States are estimated to be current binge drinkers. This analysis builds on previous work of Blazer and Wu⁶ that examined binge drinking among adults aged 50 years and older; and we found similar associations with binge drinking, including male sex and use of tobacco, which are also predictors of heavy drinking longitudinally as adults age.¹⁰ Similar to the work of Blazer and Wu,⁶ we also did not find any associations with mental health disorders, which is consistent with more recent studies of older adults.^{2,5} However, one key

Table 1. Characteristics of Older Adults Reporting Past-Month Binge Drinking: NSDUH, 2015 to 2017

Characteristic	Full sample for all adults aged ≥65 y (n = 10 927), weighted % (95% CI) ^a	Aged ≥65 y without past-month alcohol use (n = 6307 [56.8%]), weighted % (95% CI) ^a	Aged ≥65 y with past-month alcohol use without binge drinking (n = 3485 [32.7%]), weighted % (95% CI) ^a	Aged ≥65 y with past-month binge drinking (n = 1135 [10.6%]), weighted % (95% CI) ^a	P value (binge drinkers vs alcohol use without binge drinking)
Sex					
Male	44.7 (43.4-46.0)	39.6 (38.1-41.2)	49.3 (47.3-51.3)	58.3 (54.3-62.1)	<.001
Female	55.3 (54.0-56.6)	60.4 (58.8-61.9)	50.7 (48.7-52.7)	41.7 (37.9-45.7)	
Race/ethnicity					
Non-Hispanic white	77.4 (76.2-78.5)	70.9 (69.0-72.8)	87.7 (86.5-88.8)	79.8 (76.0-83.1)	<.001
Non-Hispanic African American	9.0 (8.3-9.7)	11.6 (10.5-12.8)	4.3 (3.6-5.2)	9.5 (7.2-12.2)	
Hispanic	8.2 (7.3-9.1)	10.4 (9.2-11.7)	4.6 (3.9-5.6)	7.1 (5.5-9.2)	
Non-Hispanic Asian	3.4 (2.9-4.0)	4.5 (3.7-5.4)	2.0 (1.5-2.6)	2.0 (1.0-3.7)	
Other	2.1 (1.8-2.5)	2.6 (2.2-3.2)	1.4 (1.0-2.0)	1.7 (1.1-2.7)	
Total family income, \$					
<20 000	17.0 (16.0-18.1)	22.8 (21.4-24.2)	8.0 (7.0-9.0)	13.8 (11.0-17.1)	<.001
20 000-49 999	37.1 (36.1-38.2)	42.0 (40.4-43.6)	30.6 (28.2-33.1)	31.3 (27.9-34.8)	
50 000-74 999	17.5 (16.7-18.4)	16.2 (15.2-17.4)	19.0 (17.3-20.7)	20.0 (17.0-23.3)	
≥75 000	28.3 (27.1-29.7)	19.0 (17.6-20.4)	42.5 (40.3-44.7)	35.0 (31.7-38.4)	
Education					
<High School	16.0 (15.0-17.2)	22.8 (21.1-24.5)	5.7 (4.8-6.6)	12.1 (10.0-14.5)	<.001
High School diploma	27.9 (26.8-29.0)	32.2 (30.7-33.7)	20.8 (18.9-22.8)	26.7 (24.1-29.5)	
Some College	25.4 (24.5-26.3)	23.5 (22.3-24.8)	27.6 (26.0-29.3)	28.4 (24.9-32.1)	
≥College graduate	30.7 (29.5-32.0)	21.6 (20.2-22.9)	46.0 (43.8-48.2)	32.9 (29.4-36.5)	
Marital status					
Married	59.9 (58.6-61.2)	54.9 (53.1-56.7)	67.3 (65.5-69.0)	64.1 (60.3-67.7)	.02
Widowed	21.1 (20.1-22.1)	25.4 (24.0-26.9)	15.8 (14.4-17.2)	14.2 (11.6-17.1)	
Divorced or separated	14.6 (13.6-15.6)	14.8 (13.6-16.2)	13.4 (12.1-14.8)	16.8 (14.4-19.6)	
Never married	4.5 (4.1-4.9)	4.9 (4.4-5.4)	3.6 (2.9-4.3)	5.0 (3.7-6.6)	
Drug and other substance use (past month)					
Tobacco use	11.4 (10.7-12.1)	10.6 (9.6-11.6)	9.7 (8.6-11.0)	21.1 (18.8-23.6)	<.001
Cannabis use	2.0 (1.7-2.3)	1.1 (0.8-1.6)	2.3 (1.8-3.0)	5.5 (4.3-7.1)	<.001
Prescription psychotherapeutic drug misuse ^b	0.5 (0.4-0.8)	0.3 (0.2-0.5)	0.8 (0.5-1.4)	0.9 (0.4-2.0)	.84
Mental health (past year)					
Severe mental illness	1.5 (1.2-1.8)	1.7 (1.3-2.1)	1.1 (0.7-1.7)	1.7 (1.0-2.9)	.16
Received mental health treatment	10.8 (10.0-11.6)	10.4 (9.4-11.6)	10.7 (9.5-12.0)	13.1 (10.5-16.3)	.11
Chronic diseases					
Cardiovascular disease	27.8 (26.8-28.8)	28.8 (27.5-30.2)	27.6 (25.5-29.8)	23.1 (20.2-26.4)	.03
Diabetes	21.6 (20.7-22.6)	26.1 (24.8-27.5)	15.1 (13.7-16.6)	17.7 (15.5-20.1)	.05

(Continues)

Table 1 (Contd.)

Characteristic	Full sample for all adults aged ≥65 y (n = 10 927), weighted % (95% CI) ^a	Aged ≥65 y without past-month alcohol use (n = 6307 [56.8%]), weighted % (95% CI) ^a	Aged ≥65 y with past-month alcohol use without binge drinking (n = 3485 [32.7%]), weighted % (95% CI) ^a	Aged ≥65 y with past-month binge drinking (n = 1135 [10.6%]), weighted % (95% CI) ^a	P value (binge drinkers vs alcohol use without binge drinking)
Chronic obstructive pulmonary disease	9.5 (8.7-10.3)	11.0 (10.0-12.0)	7.3 (6.4-8.4)	8.3 (6.5-10.5)	.39
Cirrhosis	0.6 (0.4-0.8)	0.8 (0.6-1.1)	0.1 (0.04-0.4)	0.6 (0.3-1.4)	.02
Hepatitis B or C	1.9 (1.6-2.3)	1.8 (1.5-2.3)	2.0 (1.4-2.8)	2.1 (1.2-3.7)	.85
Kidney disease	5.0 (4.4-5.5)	5.9 (5.2-6.8)	4.1 (3.5-5.0)	2.4 (1.5-4.0)	.05
Asthma	7.5 (6.9-8.2)	7.6 (6.9-8.4)	7.2 (6.3-8.3)	7.5 (5.5-10.3)	.79
Hypertension	41.3 (40.2-42.5)	41.7 (40.0-43.4)	40.7 (38.7-42.8)	41.4 (37.3-45.5)	.80
Cancer	17.1 (16.3-17.9)	15.8 (14.8-17.0)	20.0 (18.6-21.6)	14.3 (12.0-17.0)	<.001
≥2 Chronic diseases	35.2 (34.1-36.3)	36.7 (35.4-38.0)	34.5 (32.3-36.7)	29.0 (25.4-32.8)	0.03
All-cause emergency department use past year	29.1 (28.0-30.2)	32.6 (31.2-34.0)	23.5 (21.4-25.6)	27.7 (24.5-31.2)	.04

Note: Data are from the 2015 to 2017 NSDUH.

Abbreviations: CI, confidence interval; NSDUH, US National Survey on Drug Use and Health.

^aAll percentages are weighted, and percentages have been rounded and may not sum to 100.

^bPsychotherapeutic drugs include opioids, sedatives, stimulants, and tranquilizers. Misuse is defined as use in any way that a physician did not direct you to use them, including use without a prescription of the respondent's own; use in greater amounts, more often, or longer than the respondent was told to take them; or use in any other way a physician did not direct the respondent to use them.

difference was the association between education level and binge drinking; the current study found that lower education was associated with binge drinking in adults aged 65 years and older, whereas the prior study found that higher education was associated with binge drinking in adults aged 50 years and older.⁹ There are a number of studies, including longitudinal studies that report associations between lower education and a higher odds of heavy or binge drinking.^{5,10-12} The noted differences from the 2005/2006 NSDUH study may be due to population differences or due to a change in the demographics of older binge drinkers. However, given major changes in the survey design of NSDUH in 2015 (including the change in definition of binge drinking), it is impossible to directly compare estimates. But with the increase in alcohol use among older adults, future work should focus on examining possible demographic changes of older adults who engage in binge drinking and other unhealthy alcohol use behaviors.

Our study found a large proportion of older binge drinkers have chronic diseases that can be exacerbated by binge drinking use, including hypertension, diabetes, and cardiovascular disease. The prevalence of binge drinking being lower among adults having more chronic diseases in this study is consistent with other studies.¹²⁻¹⁴ This is likely due to selection biases common in observational studies of alcohol use as people with increasing illness tend to stop drinking.¹⁵ This is referred to as the "sick quitter" hypothesis, where alcohol may have contributed to poor health and, therefore, the selection biases lead researchers to compare a population of healthy older drinkers to unhealthy nondrinkers.^{16,17} Regardless, practicing clinicians must be aware that some older adults with chronic disease engage in binge drinking behaviors. Further, while binge drinkers had a lower prevalence of most chronic diseases and of medical multimorbidity compared to alcohol users who did not binge drink, we found a positive association of binge drinking and all-cause ED use. While this study cannot deduce whether ED use was related to alcohol use, the United States has experienced increasing rates of alcohol-related hospital admissions among older adults.¹⁸ This has important public health consequences as the continued increase in binge drinking among this population may lead to higher healthcare costs and an increase in societal burdens.

The association of binge drinking with cannabis use has important health implications. Among younger adults, co-use of cannabis and alcohol is common and associated with more harmful outcomes compared to use of either substance alone.¹⁹ Co-use of both may lead to higher impairment effects, a higher consumption of both substances, and a higher risk of experiencing comorbid substance use and mental health disorders.²⁰ This is particularly important as cannabis use is becoming more prevalent among older adults,²¹ and older adults may not be aware of the possible dangers of using cannabis with alcohol. We also found an association with binge drinking and tobacco use, which has been demonstrated in previous studies among older adults.^{2,4,9,10} The co-use of drinking and tobacco use, particularly at higher levels of alcohol use, has been associated with mortality among younger adults.^{22,23} Given the strong associations with both cannabis and alcohol with tobacco, older adults may be particularly vulnerable to the dangers of the co-use of all three substances,⁴ and should be educated on its risks.

This study has several limitations. The NSDUH relies on self-report and is subject to limited recall and social-desirability bias. The latter may be particularly true for substance use, where

Table 2. Factors Associated with Past-Month Binge Drinking Among Past-Month Alcohol Users, Aged 65 Years or Older: NSDUH, 2015 to 2017

Characteristic	Crude prevalence ratio	95% CI	P value	Adjusted prevalence ratio ^a	95% CI	P value
Sex						
Male	Reference			Reference		
Female	0.76	0.66-0.88	.001	0.78	0.67-0.91	.002
Race/ethnicity						
Non-Hispanic white	Reference			Reference		
Non-Hispanic African American	1.83	1.48-2.27	<.001	1.44	1.15-1.80	.002
Hispanic	1.46	1.14-1.86	.004	1.21	0.94-1.54	.13
Non-Hispanic Asian	1.05	0.60-1.85	.86	1.31	0.73-2.36	.36
Other	1.25	0.86-1.83	.24	1.19	0.85-1.66	.31
Total family income, \$						
<20 000	Reference			Reference		
20 000-49 999	0.69	0.55-0.87	.002	0.87	0.67-1.11	.25
50 000-74 999	0.71	0.58-0.86	.001	0.97	0.79-1.20	.79
≥75 000	0.59	0.49-0.71	<.001	0.87	0.68-1.12	.27
Education						
Less than high school	Reference			Reference		
High school diploma	0.72	0.60-0.86	.001	0.85	0.70-1.03	.09
Some college	0.61	0.52-0.72	<.001	0.72	0.61-0.85	<.001
College graduate or more	0.46	0.38-0.56	<.001	0.57	0.46-0.71	<.001
Marital status						
Married	Reference			Reference		
Widowed	0.96	0.78-1.17	.65	0.94	0.77-1.16	.57
Divorced or separated	1.23	1.06-1.42	.01	1.07	0.89-1.28	.46
Never married	1.32	1.01-1.72	.04	1.17	0.90-1.54	.24
Drug and other substance use in past month						
Tobacco use	1.87	1.64-2.13	<.001	1.52	1.33-1.74	<.001
Cannabis use	1.83	1.48-2.27	<.001	1.41	1.11-1.80	.007
Prescription psychotherapeutic drug misuse ^b	1.07	0.54-2.15	.84	1.12	0.51-2.43	.78
Mental health (past year)						
Severe mental illness	1.59	0.83-3.07	.16	1.10	0.75-1.61	.62
Received mental health treatment	1.26	0.95-1.67	.11	1.23	0.97-1.54	.08
Medical multimorbidity (≥2 chronic diseases ^c)	0.82	0.69-0.98	.03	0.83	0.70-0.98	.03
All-cause emergency department use in past year	1.18	1.01-1.38	.03	1.16	1.00-1.33	.05

Note: Data are from the 2015 to 2017 NSDUH.

Abbreviations: CI, confidence interval; NSDUH, US National Survey on Drug Use and Health.

^aModel adjusted for all characteristics reported in the table, including survey year, to adjust for potential secular trends in use over time.

^bPsychotherapeutic drugs include opioids, sedatives, stimulants, and tranquilizers. Misuse is defined as in any way that a physician did not direct you to use them, including use without a prescription of the respondent's own; use in greater amounts, more often, or longer than the respondent was told to take them; or use in any other way a physician did not direct the respondent to use them.

^cChronic diseases include asthma, chronic obstructive pulmonary disease, cirrhosis, diabetes, cardiovascular disease, hepatitis, hypertension, cancer, and kidney disease.

respondents may deny alcohol use, although the survey attempts to limit this via ACASI. The NSDUH also samples only the noninstitutionalized US population. Finally, the survey is cross-sectional, and different participants were sampled each year; therefore, this study cannot establish causality. Another limitation of this study is the use of NSDUH's threshold for binge drinking. While NSDUH uses NIAAA's recommended thresholds for binge drinking, which include differences by sex but not by age, NIAAA also recommends lower maximum drinking limits for all adults aged 65 years and older: no more than three drinks in a day.²⁴ Due to the way binge drinking is defined in this dataset, we are unable to examine binge drinking using the lower threshold for older men. Since our analysis used the higher cutoff for binge drinking, these data likely underestimate prevalence of binge drinking among older adults.

Binge drinking is a risky behavior that may negatively influence the health of older adults. The results from this study, therefore, underscore the importance of screening for binge drinking behaviors among older adults who may not be aware of their heightened risk of worsening of chronic disease and injury older adults may also not know of NIAAA's lower recommended drinking levels or that alcohol use may interact with prescribed medications.⁴ A one-question option for screening is with the modified National Institute on Drug Abuse Quick Screen for alcohol: "How many times in the past year have you had four or more drinks in a day?"^{4,25} In addition, other means of screening and intervention through web-based or mobile approaches may obviate some of the barriers to screening in clinical settings and has the potential to reach a wider population.²⁶ A study examining data from the website, AlcoholScreening.org, identified 85% of older adults visiting the website met criteria for

unhealthy alcohol use.²⁷ Public health campaigns, such as those targeting adolescents and adults, are another means, yet unexplored, of educating the public about the dangers of binge drinking by older adults. In conclusion, with the aging of the population and the increases in alcohol use, including binge drinking in those aged 65 years and older, it is time to advocate for more effective means of educating, screening, and intervening to prevent alcohol-related harms in older adults.

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Author Contributions: Study concept and design (Han, Moore, and Palamar), data analysis (Palamar), interpretation of data (Han, Moore, and Palamar), and preparation of manuscript and literature search (Ferris, Han, Moore, and Palamar).

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