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Alcohol Consumption, Medical Conditions and Health Behavior in Older Adults

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Key words: older adults, alcohol, behavioral health risks, obesity, gender, ethnicity

Abstract

Objectives: To examine associations between drinking patterns, medical conditions and behavioral health risks among older adults. **Methods:** Analyses compared survey participants (health plan members ages 65 to 90, N = 6,662) who drank moderately to those who drank over recommended limits or did not drink. **Results:** Over-limit drinking was associated with smoking; not trying to eat low fat foods (in men), and lower BMI (in women). Predictors of not drinking during the prior 12 months included ethnicity, lower education, worse self-reported health; diabetes and heart problems. **Conclusions:** Significant relationships exist between health and alcohol consumption patterns, which vary by gender.

INTRODUCTION

Older adults comprise a large and fast-growing segment of the U.S. population. Yet alcohol consumption in this demographic group has received little study. This is a significant oversight since heavy drinking has been associated with development of multiple medical,^{1, 2} functional,³ and psychiatric problems to which older adults are especially vulnerable.^{4, 5} Excessive alcohol consumption may be clustered with other behavioral health risks such as smoking and poor diet,^{6, 7} and obesity,⁸ increasing cumulative risk for medical problems. In contrast, light to moderate drinking may have health benefits.⁹ In studies of heart disease, moderate drinking has been associated with lower mortality than either abstinence or heavy consumption.¹⁰⁻¹² These studies indicate that alcohol is harmful to health in excess but potentially helpful in moderation, and that the relationship of drinking to health is complex.

To prevent serious health problems, recommended drinking limits for older adults have been proposed.^{7, 13} Because alcohol can exacerbate medical conditions and has potential for adverse medication interactions, older adults with health problems who drank when they were younger may stop drinking completely.¹⁴⁻¹⁶ This tendency may explain why studies comparing older adults who drink heavily or moderately to those who abstain completely have found that abstainers have poorer health.¹⁷⁻¹⁹ For example, in a large sample of male primary care patients ages 65 and over, patients who reported drinking alcohol in the previous year had better health status (as measured by the SF-36) than abstainers.¹⁷

Epidemiological studies have found that older women tend to drink smaller quantities of alcohol than older men, have fewer alcohol-related problems,^{20, 21} and are more likely to abstain totally.²² Yet prevalence of drinking over recommended limits is comparable when the limits are set lower for women than for men, as some guidelines have proposed.¹³ For example, in a large

(N = 5065) multi-site primary care study of patients ages 60 and over, 15% of men consumed over 14 drinks per week and 12% of women regularly drank over 7 drinks per week.⁷ These data indicate that while women drink less than men, both men and women may be at risk due to over-limit drinking.

Gender may be associated with changes in drinking patterns in late life as well as other health behaviors.²³ Older women have higher abstinence rates than older men following chemical dependency treatment, based on a study of 92 alcohol dependent patients ages 55 and over in a managed care outpatient treatment program.²⁴ In that study, women had a later onset of heavy drinking than men, but were drinking similar amounts of alcohol at the time of treatment entry. In a Canadian population-based survey of older adults, women were more likely than men to take steps to improve their health such as changing diet and using preventive services.²⁵ In a study of 139 primary care patients in San Francisco, women who stopped drinking had higher rates of hypertension and heart problems than current drinkers, while the same relationship was not observed among men.¹⁶ Based on this limited literature, we anticipated that older women in the current study might be more likely to eliminate drinking in the presence of chronic health problems.

There have been few studies of any kind examining ethnic differences in older adult drinking patterns. Adults 65 and over were included in the National Epidemiologic Survey on Alcohol and Related Conditions (NESARC), a nationally representative sample. Among men, alcohol abuse (based on DSM-IV criteria) was diagnosed in 2.38% of Whites, 1.79% of Blacks, 0.00% of Asians, and 3.69% of Hispanics. Among women, alcohol abuse was diagnosed in 0.36% of Whites, 0.12% of Blacks, 0.00% of Asians and 0.00% of Hispanics.²⁶ This study only examined substance use disorders, and did not report alcohol use patterns (abstinence or

quantity/frequency) in the sample. One study comparing small samples of African-American and White alcohol-dependent men found that African-Americans were more likely to have experienced adverse social consequences due to drinking.²⁷ The authors speculated that once alcohol problems develop, they may become more severe for older minorities due to having fewer financial resources. In addition to cultural and economic factors, ethnic differences in life course trajectories of alcohol use²⁸ may be influenced by higher rates of health problems for which drinking is not recommended, such as diabetes, especially among Hispanic and African-American adults.^{29,30} Based on these factors, it was anticipated that ethnic minorities in the present study of older adults might be more likely than Whites to report recent cessation of alcohol consumption.

This current study contributes to the existing literature in several ways. It uses a large, representative health plan population sample to describe patterns of alcohol consumption and abstinence by ethnicity and gender among older adults. Consumption measures correspond to widely used drinking guidelines, and thus are relevant to clinical practice. It differentiates those who reported quitting drinking from those who never consumed alcohol as adults, an important yet often overlooked distinction in examining the relationship of alcohol to health.³¹ To our knowledge, it is the first study that correlates alcohol consumption among older adults with chronic medical conditions, health status and behavioral health risks. It reports on the relationship of alcohol use to obesity, an important area of investigation in which the existing literature is sparse.

In summary, it was anticipated that individuals who drank above recommended limits or who had ceased drinking would be more likely to report physical and mental health problems than those who drank moderately (within recommended limits); and that over-limit drinking would be

associated with other behavioral health risks. Based on the limited literature described above, it was expected that alcohol consumption would vary by gender and ethnicity. Understanding these patterns has the potential to inform strategies to limit alcohol consumption among older adults.

METHODS

Data for this study came from the 2002 Kaiser Permanente (KP) Adult Member Health Survey, a mailed survey of a stratified random sample of health plan members in the Northern California region. The survey, which was available only in English, included questions about demographic and health-related characteristics. All measures were based on self-report. In April 2002, 8-page questionnaires were mailed to a stratified random sample of 40,000 adult KP Northern California Region Health Plan members aged 20 and over. Two subsequent survey packet mailings were sent to non-respondents, with the final wave of questionnaires mailed in mid-July. The survey was available only in English. Respondent data were assigned a post-stratification weighting factor based on the sampling time frame, such that the final weighted sample would reflect the age, gender, and geographic distribution of the actual adult membership aged 65-90 at the time of the survey.

Among adults ages 65 and over, response rate was 74.4% for women ($n = 3,461/4,655$), and 73.6% for men ($n = 3,436/4,670$); after excluding from the denominator those individuals who were deceased, no longer health plan members, or for whom no current address was available through KP records or the post office. The sample for the current analyses was restricted to adults ages 65 to 90.

Measures

Demographic characteristics. The questionnaire asked age, gender, race/ethnicity, highest level of education, and marital status.

Alcohol consumption. Participants were asked “During the past 12 months, how often have you had a drink containing alcohol?”, with response options of “almost every day, 5 to 6 times a week, 3 to 4 times a week, 1 to 2 times a week, 2-4 times a month, 1 time a month or less, never in the past 12 months (used to drink) or never drank as an adult.” Those who reported consuming any alcohol were asked “On days when you had a drink, how many drinks did you usually have?”, with examples given of one drink equaling a 12-oz. can of beer, 4 oz. of wine or 1 oz. shot of hard liquor. Average amount of alcohol consumed per week was estimated based on a combination of these two items.³² Although no collateral or biochemical verification of participants’ alcohol use was available, similar self-report quantity, frequency, and heavy drinking questions have shown moderate to good validity, and excellent reliability in an older adult primary care sample.³³ Consistent with prior studies, women were categorized as over-limit drinkers if they reported drinking either more than one drink at a time or more than 7 drinks per week, while men were considered over-limit if they consumed either more than 2 drinks at a time or more than 14 drinks per week.⁷

Health conditions. Participants were asked to indicate whether, during the prior 12 months, they had (or took medication for) any of 28 major health conditions. We restricted our analysis to seven self-reported chronic conditions common in older adults (heart problems, high blood pressure, high cholesterol, arthritis, diabetes, depression and anxiety). Participants were also asked if they had a problem either alcohol or drugs (yes/no) in the prior 12 months.

Participants were also asked to rate their overall health status using the question, “in general, would you say your health is excellent, very good, good, fair or poor.” This question is predictive of future health care utilization,³⁴ morbidity³⁵ and mortality.³⁶ The measure was

dichotomized (excellent, very good, or good vs. fair or poor) in the analyses.^{37, 38} Body mass index (BMI) was calculated using questions asking about height and weight.

Behavioral health risks. Participants were asked if they currently smoked cigarettes (yes/no). They were asked “During the past 12 months, how often did you usually get physical exercise (such as walking, swimming, gardening, golf, tennis, etc.): 5 or more times per week, 3 to 4 times a week, 1 to 2 times a week, 2 to 4 times a month, once a month or less, or never.” As an indicator of a sedentary lifestyle, we dichotomized the measure to compare those who exercised 2 to 4 times per month or less (well under recommended frequency).³⁹ to those who exercised more often. Regarding diet they were asked “About how often do you try to eat reduced-fat foods: all the time, most of the time, some of the time, a little of the time, or never.” This variable was dichotomized (a little of the time/never vs. some/most/all or the time) as an indicator of having poor dietary practices.

Analyses

Participants were divided into four categories of drinking behavior: adult non-drinkers, abstinent for ≥ 12 months, moderate drinkers (i.e., those who drank under recommended limits), and over-limit drinkers (more than one drink at a time or more than 7 drinks per week for women, more than 2 drinks at a time or more than 14 drinks per week for men).⁷ Because some current guidelines suggest no more than 7 drinks per week for both men and women,⁴⁰ the study replicated the analysis for men using this lower limit, to see whether using a lower drinking cutoff yielded different results regarding the relationship of alcohol consumption to health measures. A sub-analysis compared medical conditions of heavy drinkers (over 3 drinks per day for women and over 4 drinks per day for men) to current drinkers who consumed less than this amount, controlling for age and ethnicity, using logistic regression. Overall group differences in

demographic characteristics and health measures between categories of drinking behavior were examined using Rao-Scott chi-square, with respondent data weighted to reflect the sampling procedures in the survey.

To examine the relationship of medical conditions, self-reported health and behavioral health risks to both drinking cessation (≥ 12 -month abstinence) and over-limit drinking, separate logistic regression analyses were conducted to test the effect of drinking status on these health variables, controlling for age and ethnicity.

To develop the model predicting drinking cessation, bivariate comparisons were made between current drinkers and those who had been drinkers during adulthood, but had ceased drinking (≥ 12 month abstinence). Variables selected for the logistic regression models included those factors significant in the bivariate comparisons: age (measured in 5 year intervals, reference group 65-69), ethnicity (African-American, Asian, and Latino, with White non-Hispanic as reference group) lower education (≤ 12 years vs. at least some college as reference group), perceived health status (fair or poor vs. good-excellent as reference group) and the presence of selected health conditions. Logistic regression was used to examine factors associated with cessation of drinking, among participants who had consumed alcohol as adults, with analyses conducted separately for men and women. All analyses were conducted with weighted data using SAS version 9.1 procedures (Proc Surveyfreq and Proc Survelogistic) for analysis of data obtained from a complex survey design. These special procedures take into account error introduced by design effects when calculating the variances used for significance testing.

RESULTS

Sample

The final sample consisted of 6,662 individuals ages 65 to 90. This included 3316 men (737 men ages 65 to 69, 737 ages 70 to 74, 1330 ages 75 to 79, 351 ages 80 to 84 and 161 ages 85 to 90) and 3346 women (803 ages 65 to 69, 750 ages 70 to 74, 1329 ages 75 to 79, 330 ages 80 to 84, and 134 ages 85 to 90). Based on weighted data, participants had a mean age of 73.7 ($sd = 6.3$). Ethnicity data was available for 92% of the sample. Among men, respondents were 82.5% White, 5.0% African-American, 5.6% Latino, and 6.9% Asian American. Among women, respondents were 79.4% White, 5.2% African-American, 7.2% Latino, and 8.2% Asian American. A small percentage (2 %) reporting Pacific Islander, Native American or “other” were excluded from analyses by ethnicity.

Patterns of Alcohol Consumption

Drinking data were available for 6,116 participants (3,081 men and 3,035 women) with 546 missing (8%) due to non-response on one or more drinking items. Those with missing data were older ($p < .001$), and more likely to be female ($p < .001$) and non-white ($p < .001$) than those without missing data.

[Table 1 here]

Results found that 12.1% of men and 16.6% of women drank over recommended limits. Of these, men reported an average of 3.8 ($sd = 1.53$) drinks and women an average of 2.2 ($sd = 0.59$) drinks consumed on days when they drank alcohol (not shown). There were significant overall effects on drinking category by age group, ethnicity and relationship status (Table 1). Among both men and women, over-limit drinking was lower in the older age groups (e.g., ages 80 to 90 vs. 65-74 or 75-79), while ≥ 12 -month abstinence was higher in older age groups. Whites and Latinos had the highest percentages of over-limit drinkers and Asians the lowest percentages, and African-Americans higher percentages of 12-month abstainers than other ethnic groups. Less

educated men and women were more likely to report long-term abstinence or 12-month abstinence than those with higher levels of education.

Medical Conditions and Behavioral Health Risks

Medical conditions and behavioral health risks were examined for men and women. Overall group differences by drinking category were examined using chi-square (Table 2). Logistic regression analyses examined odds of having health conditions, fair or poor self-reported health (vs. good, very good, or excellent), and behavioral health risks among those who reported over-limit drinking in the prior 12 months vs. moderate drinkers, adjusting for age and ethnicity. Medical conditions were also adjusted for BMI. Few significant relationships were found between over-limit drinking and prevalence of major medical conditions. Contrary to expectation, men who drank over limits had lower prevalence of heart problems (OR = 0.71, CI = 0.51, 0.99), and high cholesterol (OR = 0.71, CI = 0.53, 0.95) than moderate drinkers. Women who drank over limits had lower prevalence of heart problems (OR = 0.61, CI = 0.41, 0.93) and high cholesterol (OR = 0.75, CI = 0.57, 0.99) than moderate drinkers. When compared with moderate drinking, over-limit drinking was associated with poorer dietary habits (not trying to eat reduced fat foods) among men (OR = 1.58, CI = 1.21, 2.06), and with current cigarette smoking among women (OR = 2.36, CI = 1.56, 3.57) and men (OR = 2.35, CI = 1.56, 3.53). Among women, over-limit drinking was associated with greater likelihood of being sedentary (OR = 1.49, CI = 1.09, 2.06), but lower likelihood of being overweight (BMI $\geq$ 30), (OR = 0.61, CI = 0.43, 0.85).

[Table 2 here]

When the relationship of drinking level with medical problems was examined using the lower recommended drinking limit for men (no more than one drink per day), as expected a much

larger number of individuals were categorized as over-limit drinkers (32.2% of male study participants, rather than 12.1%). However, only one health correlate changed: overall effect of drinking level on having a lower rate of heart problems became significant ($p = .002$, not shown).

A sub-analysis compared health conditions of male heavy drinkers ($n = 131$), who consumed over 4 drinks per day, to currently drinking males who drank less than this amount, controlling for age and race. The small number of heavy drinkers resulted in limited statistical power for this analysis within men and precluded any such comparisons for women ($n=17$ heavy drinkers). The only statistically significant difference was that heavy drinkers were less likely to report having or being treated for high cholesterol than other drinkers (39.1% vs. 22.1%, $p = .001$).

Health Factors Associated with Drinking Cessation

Logistic regression analyses examined odds of having health conditions, fair or poor self-reported health (vs. good, very good, or excellent), and behavioral health risks among those who reported moderate drinking vs. those who reported no drinking in the prior 12 months vs. adjusting for age and ethnicity (see post hoc comparisons reported on Table 2). Medical conditions were also adjusted for BMI. Variables associated moderate drinking vs. ≥ 12 month abstinence included lower likelihood of having diabetes ($OR = 0.55$, $CI = 0.41, 0.75$), depression ($OR = 0.55$, $CI = 0.36, 0.83$), anxiety ($OR = 0.45$, $CI = 0.24, 0.85$), fair or poor health ($OR = 0.41$, $CI = 0.31, 0.53$), smoking cigarettes ($OR = 0.53$, $CI = 0.35, 0.80$) and being sedentary ($OR = 0.60$, $CI = 0.44, 0.83$) among men; and heart problems ($OR = 0.47$, $CI = 0.33, 0.66$), diabetes ($OR = 0.35$, $CI = 0.24, 0.52$), arthritis ($OR = 0.73$, $CI = 0.55, 0.97$), depression ($OR = 0.50$, $CI = 0.34, 0.72$), fair or poor health ($OR = 0.25$, $CI = 0.19, 0.34$), smoking ($OR = 0.48$, $CI = 0.30, 0.77$) and being sedentary ($OR = 0.37$, $CI = 0.26, 0.51$) among women.

Predictors of Drinking Cessation

In logistic regression analysis, predictors of having quit drinking (≥ 12 -month abstinence among former alcohol consumers) vs. any level of current drinking were examined separately for men and women. To select variables for the model, bivariate chi-square analyses were used to compare demographic factors and health conditions of current drinkers to those of participants who had abstained for ≥ 12 -months. Individuals who never drank as adults were excluded. Factors significant at the $p < .10$ level were included in the initial model: Age group, ethnicity (African-American, Hispanic, and Asian American vs. White), marital status, education, self-reported health, diabetes, and heart problems were in the models for both genders; high blood pressure and high cholesterol were in the initial model for women only. Results of the final model found that among both men and women, drinking cessation was predicted by ethnicity (African-American vs. White), lower education, diabetes, and worse self-reported health. Depression was significant among men only. Heart problems were significant among women only (Table 3). Age group was not significant in either final model. Using unweighted data

To estimate overall discriminative power of the model in separating current drinkers from those who had quit drinking, we calculated the c statistic, which is equivalent to the area under the ROC curve for the model.⁴¹ For men, $c = 0.641$; for women, $c = 0.718$. Results indicate the probability that the model would correctly assign possible cases involving the dependent variable 64.1% of the time for men and 71.8% of the time for women. For the overall model, pseudo-R-squared = .04 for men, $p < .001$, and .08 for women, $p < .001$, using unweighted data in order to obtain correct sample size for calculation of pseudo-R-squared.

[Table 3 here]

DISCUSSION

This study examined how health conditions and behaviors, gender and ethnicity are related to drinking patterns among older adults, including over-limit drinking and drinking cessation (≥ 12 -month abstinence). While increased prevalence of medical problems with over-limit drinking was not found, over-limit drinking was associated with other behavioral health risks. Results found an association between health problems and having stopped drinking. Factors independently associated with drinking cessation among both women and men included lower education, ethnicity (African-American) and worse self-reported health.

The results help inform understanding of how age influences alcohol consumption. Although not uniform across cohorts,⁴² longitudinal studies have found a decline in quantity of alcohol consumed and an increase in abstinence with age.^{20, 21} Medical illness has also been associated with changes in alcohol consumption in middle-aged populations, as we found in our sample.⁴³ Lack of an independent effect of age on drinking cessation in our sample suggests that medical illness may be more important than age in motivating drinking reduction.

Gender Differences

Among both men and women, medical conditions and worse self-rated health were associated with non-drinking in the prior 12 months. Similar to findings in a study of a small sample of older adult primary care patients,¹⁶ heart disease was independently associated with drinking cessation among women but not among men. This may indicate that women with heart problems may be more likely to stop drinking than men. Alternatively, it has been suggested that alcohol consumption could benefit women more than men,⁴⁴ particularly for heart problems.

Gender differences were also observed in the relationship of over-limit drinking to poor dietary practices (not trying to eat low fat foods) and having BMI in the obese range (≥ 30). Over-limit drinking men had worse results than moderate drinkers on both measures, while

among women over-limit drinkers were less likely than moderate drinkers to be obese. Previous investigations in younger samples have yielded inconsistent results regarding the relationship of alcohol consumption to obesity,^{45, 46} with some recent evidence from a general population sample that quantity of alcohol consumed may increase BMI (measured as a continuous variable) among both women and men.²² In contrast, our findings suggest that among older women, over-limit drinking may not have an adverse impact on rates of obesity.

Clinical Implications

Our results suggest that older men and women who drink over recommended limits may not, in the short term, present in health care settings with worse health than other patients.⁵ However, over-limit drinkers are more likely than moderate drinkers to have behavioral health risks such as smoking and poor dietary practices, which could be targeted for intervention by medical providers. It is cautioned that because of the correlational study design in a sample with relatively few heavy drinkers, and potential risks associated with over-limit drinking, our findings do not support clinical recommendations for older adults to consume alcohol or to disregard established drinking guidelines.

The relationship between health problems, worse self-reported health and cessation of alcohol consumption implies that medical illness and the perception of having poor health may motivate elimination of alcohol use. Brief interventions focused on adverse drinking consequences may effectively capitalize on this inclination.^{5, 47} Brief interventions may also be useful to reduce drinking in patients with type 2 diabetes and hypertension,⁴⁸ a finding particularly relevant to this sample.

Limitations

Because the survey was conducted only in English, individuals who are non-English speaking or who have very poor reading ability may be underrepresented. African-Americans and Hispanics may be less likely to respond to the survey than Whites and Pacific Islanders, based on analysis of a previous (1993) Kaiser Member Health Survey year.⁴⁹ Health plan members who were very sick and frail or who resided in skilled nursing facilities were unlikely to respond. Nonresponse on the alcohol questions was higher among non-whites and women, people with lower levels of education, and the oldest study participants. Because these non-respondents were demographically similar to non-drinkers in the sample, it seems likely that some non-drinkers chose to skip the alcohol questions in the survey. Our results may therefore overestimate the proportion of the total sample that drinks. However, it is not anticipated that these missing data would bias the results regarding the relationship of drinking to health reported in the study.

The current investigation uses retrospective data and provides observational support for an association between health and alcohol consumption, but cannot draw conclusions regarding directionality of these relationships. Further, both the alcohol use and health conditions examined were based on self-report. Although self-report alcohol measures have generally good reliability, and survey participants may be less motivated to under-report drinking than they would in a clinical context, under-reporting of alcohol consumption by participants is a potential source of bias. Some respondents who reported no health conditions may have an undiagnosed disorder. However, strengths of the study include its large older adult sample, inclusion of women and minority groups who have been underrepresented in prior studies, and analysis of a privately insured sample with access to health care. The analyses also distinguished former drinkers from those who never drank as adults, and included measures of self-reported health, body mass index (BMI), and behavioral health risks.

Conclusion

This study reported patterns of alcohol consumption in a large, representative sample of adults ages 65 to 90. Results of this investigation found that those who quit drinking were more likely than current drinkers to report having medical problems, including diabetes, heart problems, and worse self-reported health. Drinking over recommended limits was not associated with medical problems in a one-year period, but was correlated with other behavioral health risks such as smoking and poor dietary practices. Gender differences were observed in the association of alcohol consumption with health and behaviors. Findings have implications for identification of older adults with problematic drinking and the development of strategies to reduce alcohol consumption.

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Table 1.
Drinking Patterns of Demographic Subgroups among Adults Ages 65 to 90

Drinking Pattern					<i>P</i>
	Never drank	≥ 12-Month	Moderate	Over-Limit	
	as Adult	Abstinent	Drinker	Drinker	
Age					
Men (%)					<.001
65-74 (n = 1377)	12.3	14.3	59.0	14.5	
75-79 (n = 1237)	12.6	16.9	60.7	9.8	
80-90 (n = 467)	18.5	15.9	58.9	6.7	
Women (%)					.002
65-74 (n = 1430)	27.2	9.6	43.3	19.8	
70-79 (n = 1210)	29.8	12.1	43.8	14.3	
80-90 (n = 395)	30.4	13.9	45.6	10.1	
Ethnicity					
Men (%)					<.001
White (n = 2554)	11.6	14.3	61.2	12.9	
African-American (n = 143)	12.0	28.9	51.2	7.9	
Latino (n = 180)	15.5	19.1	50.0	15.4	
Asian (n = 204)	36.9	12.2	48.8	2.1	
Women (%)					<.001
White (n = 2470)	24.4	11.3	45.8	18.6	
African-American (n = 157)	43.3	16.8	32.8	7.1	
Latino (n = 185)	27.6	9.9	45.8	16.6	

Asian (n = 223)	63.0	5.7	30.0	1.3
Relationship Status				
Men (%)				.015
In relationship (n = 2437)	13.8	14.3	60.6	11.3
Single (n = 615)	12.0	17.7	55.0	15.3
Women (%)				.054
In relationship (n = 1453)	29.9	9.4	43.7	17.0
Single (n = 1555)	26.9	12.7	44.2	16.3
Education level				
Men				<.001
≤ HS graduate (n = 980)	16.9	19.5	52.7	10.9
Some college or higher (n = 2080)	11.9	13.3	62.2	12.6
Women				<.001
≤ HS graduate (n = 1300)	37.3	13.4	36.0	13.3
Some college or higher (n = 1072)	21.4	9.3	50.1	19.1

Notes: N = 6060 to 6116. “Moderate drinker” equals ≤ 1 drink per day for women, ≤ 2 drinks per day for men), “over limit” equals > 1 drink per day for women or > 2 drinks per day for men. “Single” includes widowed, divorced or never-married. “In relationship” includes married or in a relationship but not married.

P-values determined by Rao-Scott Chi-Square test.

**Prevalence of Medical Conditions, Self-Reported Health and Behavioral Health Risks
among Men and Women Ages 65 to 90, in Four Drinking Pattern Categories.**

Men (N=3081)						Women (N=3035)				
	Never Drank as Adult (n = 405)	≥ 12-Month Abstinent (n = 482)	Moderate Drinker (n=1841)	Over- Limit Drinker (n = 353)	<i>p</i>	Never Drank as Adult (n = 861)	≥ 12-Month Abstinent (n = 344)	Moderate Drinker (n = 1325)	Over- Limit Drinker (n = 505)	<i>p</i>
Medical condition (%)										
Heart problems	25.7	28.9	27.5	21.2 ^b	.136	20.2	25.8 ^a	14.7	8.9 ^b	<.001
HTN	53.0	51.8	47.8	51.6	.225	60.4	57.5	49.8	43.2	<.001
High cholesterol	34.9	35.2	39.2	32.8 ^b	.121	33.8	30.5	27.3	20.0 ^b	<.001
Arthritis	17.3	16.0	18.2	18.4	.776	30.7	36.0 ^a	28.4	24.5	.012
Diabetes	24.8	22.8 ^a	14.3	12.6	<.001	18.3	21.4 ^a	8.2	5.7	<.001
Depression	6.9	10.0 ^a	5.7	5.7	.034	11.0	20.3 ^a	11.5	14.3	<.001
Anxiety	3.0	4.3 ^a	1.9	2.4	.078	5.3	8.0	5.9	5.3	.398
Fair/Poor Health	29.7	30.3 ^a	14.5	16.1	<.001	29.5	43.9 ^a	16.0	13.1	<.001
Behavioral Health Risk (%)										

Current Smoker	3.7	11.9 ^a	6.8	15.8 ^b	<.001	4.1	11.5 ^a	6.0	13.8 ^b	<.001
Sedentary	14.6	16.1 ^a	10.3	11.0	.008	21.5	32.7 ^a	14.4	19.4 ^b	<.001
Doesn't Eat Low Fat Foods	40.7	41.2	44.5	56.0 ^b	<.001	40.3	45.9	40.1	44.1	.280
BMI $\geq$ 30	16.8	19.4	18.4	25.6	.034	25.0	27.3	21.9	15.9 ^b	.002

Notes: *P*-values indicate overall significance of the difference in distribution of health variables among drinking categories, determined by Rao-Scott Chi-Square test. Post hoc comparisons used logistic regression to examine effect of drinking level (a = 12-month abstinent vs. moderate, b = over-limit vs. moderate) on health variables, controlling for age and ethnicity. Results marked “a” or “b” are significant at <.05 level.

“Moderate drinker” equals $\leq$ 1 drink per day for women, $\leq$ 2 drinks per day for men), “over limit” equals $>$ 1 drink per day for women or $>$ 2 drinks per day for men. Sedentary = exercise $<$ once per week. HTN = high blood pressure. BMI = body mass index.

Table 3.

**Logistic Regression Analysis of Predictors of Having Quit Drinking ($\geq$ 12-Month
Abstinence) in Men and Women**

Men (N = 2490)	OR	95% CI	p
Race (African-American vs others)	2.2	(1.4, 3.7)	.002
Lower education	1.5	(1.2, 2.0)	<.001
Diabetes	1.6	(1.2, 2.2)	.002
Worse self-reported health	2.2	(1.7, 2.9)	<.001
Depression	1.6	(1.3, 2.4)	.038
Women (N = 2148)	OR	95% CI	
Race (African-American vs. White)	1.6	(0.9, 2.9)	.073
Lower education	1.9	(1.5, 2.6)	<.001
Heart problems	1.7	(1.2, 2.5)	.003
Diabetes	2.2	(1.5, 3.3)	<.001
Worse self-reported health	3.4	(2.5, 4.6)	<.001

Notes: Analysis compares $\geq$ 12-month abstinence to current drinkers (light or over-limit) and excludes individuals who never drank as adults or who had missing data on any of the predictors. "Worse self-reported health" = fair or poor vs. good, very good or excellent. "Lower education" = high school graduate or less.