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Regular alcohol consumption is associated with increasing quality of life and mood in older men and women: The Rancho Bernardo Study

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Abstract

Objective—This study examines the sex-specific association between alcohol intake and health-related quality of life in middle class community-dwelling older adults.

Methods—Information on alcohol intake and measures of quality of life were obtained from 1594 participants (n=633 men, n=961 women) aged 50–97 years during a research clinic visit in 1992–96, and from their responses to a phone interview and mailed questionnaires. Quality of life measures included the Medical Outcome Study Short Form 36 (SF-36), Quality of Well-Being Scale (QWB), Life Satisfaction Index-Z (LSI-Z), and Satisfaction with Life Survey (SWLS). Depressed mood was assessed using the Beck Depression Inventory (BDI). Men and women were stratified into 4 groups of reported alcohol intake: nondrinker, occasional drinker (alcohol <3 times/week), light regular drinker (alcohol intake ≥3 times/week, but <170g/wk), and moderate regular drinker (alcohol intake ≥3 times/week and ≥ 170g/week).

Results—Average age of both sexes was 72±10 years. Only 11% of the men and 17% of the women were nondrinkers; 54% of men and 40% of women reported drinking alcohol ≥3 times per week; 18% of men and 7.5% of women were heavier regular drinkers. In multivariable regression analyses, increasing frequency of alcohol use was positively associated with better quality of life in men and in women. Associations were not explained by age, physical activity, smoking, depressed mood, or common chronic diseases including diabetes, hypertension and cardiovascular disease.

Conclusions—Regular alcohol consumption is associated with increased quality of life in older men and women.

Introduction

Excessive alcohol consumption is associated with increased morbidity and mortality, regardless of age [1] [2]. The first suggestion that moderate daily alcohol consumption was associated with better survival than abstinence was reported almost a century ago, when Raymond Pearl [3] demonstrated a U-shaped mortality curve in relation to alcohol intake among men 65 years and older residing in the Baltimore area. At that time prohibition was on the public's mind, and Pearl's conclusion was controversial. A recent meta analyses of 34

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prospective cohort studies with more than 1 million subjects and almost 100 000 deaths from any cause showed similar findings, with a J-shaped association between self-reported alcohol consumption and mortality[4]. Moreover, the beneficial effects of light and moderate alcohol consumption for cardiovascular disease are supported by a large body of evidence, as summarized in a meta analyses by Corrao and associates [2]. Positive effects of moderate drinking on cognitive function [5], dementia [6] and longevity [7–9] have also been reported.

In young adults, moderate alcohol intake has been associated with psychological and social well-being (9–11). However, few studies have examined the association of regular alcohol intake with quality of life among US elderly, although 45% of a representative sample of United States adults aged 65 to 74 years report drinking alcohol [10]. Quality of life is dependent on multiple factors including health and physical well-being as well as lifestyle variables such as smoking habit, physical activity, and alcohol use. Few previous studies of alcohol intake and well being have simultaneously taken these lifestyle variables, risk factors for cardiovascular disease, and comorbidities into account.

The purpose of the present study is to examine the independent association of reported current alcohol consumption with quality of life in older community-dwelling men and women.

Methods

Study population

Between 1972 and 1974, 82% of all adult residents in the southern California community of Rancho Bernardo were surveyed to determine the prevalence of heart disease risk factors. Participants were almost entirely Caucasian, middle- to upper-middle class and ambulatory. They have been followed to the present with periodic clinic visits and annual mailed questionnaires. Between 1992 and 1996, 82% (n=1781) of surviving community dwelling participants aged 50 and older attended a follow-up research clinic evaluation, were contacted for a telephone interview, and were mailed a questionnaire that included assessments of quality of life and current alcohol intake. After excluding nine who attended the visit but did not respond to the alcohol questions, 174 who failed to complete one or more quality of life instruments, and four who had very elevated liver function test results, there remained 1594 participants (633 men, 961 women) who form the basis of this report. This study was approved by the UCSD Institutional Review Board; all participants gave written informed consent.

Procedures

During the 1992–1996 clinic visit, height and weight were measured in participants wearing light clothing without shoes. Body mass index (BMI), defined as weight (kg)/height (m)² was used as an estimate of obesity. After participants had been seated quietly for 5 minutes, two blood pressure readings were taken at least 30 seconds apart by a technician certified by the Hypertension Detection Follow-up Protocol [11] using a standard mercury sphygmomanometer.

Blood was obtained by venipuncture after an overnight (12–16 hour) fast. Lipids and lipoproteins were measured in a Lipid Research Clinics Laboratory under the continuous standardization program of the Centers for Disease Control (Atlanta, Georgia). Fasting plasma total cholesterol and triglyceride levels were measured by enzymatic techniques with ABA-200 biochromatic analyzer (Abbott Laboratories, Irving, TX), a high performance cholesterol reagent (No. 236691, Boehringer-Mannheim Diagnostics, Indianapolis, IN), and a triglyceride agent (No. 6097, Abbott Laboratories). High density lipoprotein (HDL) cholesterol was measured by precipitating the other lipoproteins with heparin and manganase chloride according to the standardized procedures of the Lipid Research Clinics manual [12]. Low

density lipoprotein (LDL) cholesterol was calculated using the Friedwald formula [13]. Plasma glucose was measured with a glucose oxidase method in a diabetes research laboratory. Serum glutamic-oxaloacetic transaminase (SGOT) and serum glutamate pyruvate transaminase (SGPT) were assessed in a local (SmithKline Beecham) laboratory as part of a standard chemistry panel.

At the clinic visit, a standard questionnaire was used to obtain information about medical history, current cigarette smoking (no/yes), and current physical exercise three or more times per week (no/yes). Quantity of alcohol consumed (number of glasses of wine, beer, liquor or mixed drinks in the previous 2 weeks) and frequency of alcohol intake (daily, at least 3 times/week, less than 3 times/week, or non-drinking) were also queried. The four-item CAGE questionnaire [14] was used to assess possible alcohol abuse. Previous studies of the Rancho Bernardo cohort have indirectly validated these reported behaviors by showing a negative correlation between cigarette smoking and pulmonary function [15], positive correlation between alcohol consumption and HDL-cholesterol [16], and positive correlation between reported physical activity and HDL-cholesterol [17]. Women were also queried about current estrogen use, which was validated using pill containers and prescriptions brought to the clinic for that purpose.

Data from four quality of life measures were obtained as follows: The Quality of Well-Being Scale (QWB) was administered over the telephone by a trained interviewer within 2 weeks of the clinic visit; The Medical Outcomes Study Short Form 36 (SF-36) was administered via mailed survey in 1990–91; and two measures of life satisfaction, the Satisfaction with Life Survey (SWLS) and the Life Satisfaction Index-Z scale (LSI-Z) were administered with a mailed survey in 1992–93. Additionally, the Beck Depression Inventory (BDI) was administered at the time of the clinic visit (1992–96) to assess mood and possible depression. A description of each of these measures follows:

The Quality of Life (QWB) scale—is a general health status index that includes preference-weighted measures of symptoms and three levels of functioning. The reliability and validity of the QWB instrument along with the preference weights, have been reported previously [18]. The QWB can be administered through a structured telephone interview and yields a quality of life score ranging from 0.0 to 1.0 (asymptomatic, fully functioning) that demonstrates the properties of an interval scale. While no quality of life outcome instrument is considered to be the gold standard, the QWB is one of the training examples in the Health and Human Services report, reflecting its status as a widely accepted standard outcome measure [19].

The Medical Outcomes Study Short-Form 36 (SF-36)—is a widely used multidimensional measure [20], addressing both physical and psychological facets of health status. The self-administered SF-36 contains 36 multiple-choice questions and takes less than 10 minutes to complete. It provides a global health status score as well as separate mental health and physical health components scores, and has an excellent record of reliability and validity [21].

The Life Satisfaction Index-Z Scale (LSI-Z)—consists of 13 items for which respondents are asked to indicate if they agree, disagree, or don't know. Several items are reverse scored, and scores for all items are summed to yield a general measure of life satisfaction. In older individuals the LSI-Z has been shown to have high reliability and validity [22].

The Satisfaction with Life Survey (SWLS)—is a 5-item life satisfaction survey with questions that are answered on a 1–7 Likert scale. Responses for all items are summed to obtain the SWLS score. The SWLS has been shown to correlate well with other estimates of life satisfaction [23].

The Beck Depression Inventory (BDI)—is a standardized instrument that consists of a list of 21 sets of statements [24]. Respondents are asked to choose the statement from each set that most closely describes them or their feelings. Total scores on the BDI were computed by summing the responses to each question. Higher scores indicate depressed mood. Scores were used as a continuous measure or a categorical variable - those scoring > 13 were considered depressed. Reliability of the BDI, assessed with a standardized Cronbach's alpha, was 0.80,, similar to the coefficients reported in other studies of elderly community volunteers (alpha=0.76) or depressed outpatients (alpha=0.73) [25].

The CAGE assessment [26,27] consists of four self-administered questions that identify individuals with a high probability of problem drinking at any time past or present. The name "CAGE" is an acronym formed by taking the first letter of key words from each of the questions. These questions were administered during the clinic visit, and are: Have you ever felt the need to Cut down on your drinking? Ever felt Annoyed by criticism of your drinking? Had Guilty feelings about drinking? Ever taken a morning Eye-opener? [26]. Two or more positive responses to the CAGE questions are considered to represent a history of problem drinking. The CAGE questionnaire has been shown to identify problem drinking in older people [27].

Statistical Analysis

Alcohol consumption during the 2 weeks prior to the study was converted to grams of ethanol by the following formula: grams of ethanol = [(No. bottles or cans of beer) (12oz) (0.045 oz. ethanol per oz. beer) + (No. glasses of wine) (3.5oz) (0.122 oz ethanol per oz. wine) + (No. mixed drinks) (1.5 oz.) (0.41 oz. ethanol per oz. spirits) + (No. liqueurs) (1 oz.) (0.362 oz. ethanol per oz. liqueurs)) × (29.6 mls per oz.)] × 0.7893 g per ml. One drink is equivalent to 12 grams. Alcohol consumption was examined as a continuous variable (grams/week), and as a categorical variable with 4 levels: non-drinkers, occasional drinkers (alcohol intake < 3 / week), light regular drinkers (alcohol intake ≥ 3/week but <170g/wk), and moderate regular drinkers (alcohol intake ≥ 3/week and ≥ 170g/week). Diabetes was defined as having fasting plasma glucose equal or greater than 126 mg/dl or a physician diagnosis. Cardiovascular disease (CVD) was defined as the presence of coronary heart disease including angina and myocardial infarction, cerebrovascular disease including stroke and transient ischemic attack, or lower extremity arterial disease identified by claudication using the Rose questionnaire.

Demographic and lifestyle variables by category of alcohol consumption were expressed as mean ± 95% confidence interval (CI) for continuous variables and percentages for categorical variables, and were compared using the independent *t* tests, one-way analyses of variance (ANOVA), or chi-square analysis, as appropriate. Analysis of covariance (ANCOVA) was used to examine differences in mean scores for each quality of life measure across categories of alcohol consumption after adjusting for potentially confounding covariates including age, body mass index, exercise, current smoking and estrogen. For ease of interpretation results from the ANCOVA models are presented in figure 1 and figure 2. Multivariate linear regression models were used to assess the independent associations of alcohol consumption with each QOL measure after adjustment for confounders. To minimize the possible confounding effect of chronic diseases in the participant's quality of life, analyses were repeated after excluding participants with a positive history of common chronic diseases including diabetes and cardiovascular disease, and again, after excluding participants who met the definition of alcohol abuse based on the CAGE Questionnaire. Because of known sex differences in both alcohol consumption and quality of life, data for men and women were analyzed separately. Statistics were performed using SPSS (SPSS Inc., Base 10 for windows User's Guide). All tests were two-tailed with statistical significance defined as *p* < 0.05.

Results

Participants were aged 50–97 years. As shown in Table 1, men and women were of similar average age (72 years, SD=10). Reported alcohol consumption ranged from zero to 667 g/week. Among drinkers, women reported a much lower average intake than men (means=85.6 ± 100.8 in men and 49.4 ± 66.8 in women, $p<0.001$). Alcohol intake three or more times/week was reported by 54 % of men and 40% of women. Only 11% of men and 17% of women said they were non-drinkers. More than half (57.5%) reported drinking wine and 45.0% reported drinking cocktails or mixed drinks. Only 23.5% of men and 5.3% of women reported drinking beer or hard liquor. Based on CAGE questionnaire responses, 13.3% of men and 5.3% of women were current or past alcohol abusers ($p<0.001$). Sixteen men and five women classified as abstainers responded positively to at least two CAGE questions, suggesting previous alcohol abuse followed by abstinence. Nevertheless, men had significantly more favorable scores on 3 of the 4 quality of life scales, and lower BDI scores than women. Only 24 men (3.9%) and 80 women (8.7%) were considered to be clinically depressed based on the BDI categorical criteria ($BDI \geq 13$).

Table 2 shows sex-specific age and age-adjusted comparisons of characteristics by drinking status. In both sexes, total and HDL cholesterol levels increased with increasing alcohol intake. Among women, rates of categorical depression decreased and alcohol abuse increased with increasing alcohol intake ($p's \leq 0.001$). Among men, alcohol abuse was reported as frequently by moderate regular drinkers as by non-drinkers, and alcohol was not associated with depression. Liver function was not associated with alcohol intake. Chronic diseases including hypertension, diabetes and cardiovascular diseases did not vary by drinking patterns in either sex. Current smoking was uncommon, but women who were regular drinkers were more likely to be current smokers; this association was not observed in men.

Figure 1 shows multiply-adjusted mean BDI scores by drinking categories in men and women. In women, BDI decreased (indicating less depressed mood) with increasing category of alcohol consumption (p for trend < 0.001). A similar pattern was observed in men, but the trend was not statistically significant (p for trend = 0.36). Figure 2 shows sex specific multiply-adjusted mean scores of each quality of life measurement by drinking categories. In men, scores on all 4 quality of life scales significantly increased with increasing alcohol intake ($p's$ for trend < 0.05). In women, scores on the SLS, LSI-Z and SF36 increased with drinking status, with no difference observed for QWB.

Table 3 shows results the sex-specific multiply adjusted linear regression analyses examining the association of alcohol intake with each of the quality of life measures including the SF36 mental and physical health subscales and BDI. These analyses were adjusted for age, BMI, current smoking, exercise, and in women, estrogen use. As shown, in men alcohol intake was significantly and positively associated with the SF-36 global health status as well as scores for the mental and physical health subscales ($p=0.003$, $p=0.01$ and $p=0.01$ respectively) and the LSI-Z ($p=0.009$). In women alcohol intake was significantly and positively associated with scores on the SWLS ($p=0.006$), and LSI-Z ($p=0.002$), but inversely associated with BDI scores ($p=0.004$). There were no associations between alcohol intake and QWB in either men or women. Similar patterns of associations were observed after excluding the 84 men and 51 women who were classified as positive for alcohol abuse. Further adjustments for hypertension and exclusion of participants categorized as depressed (24 men and 80 women) did not materially change any of the results. Excluding the 251 men and 325 women who reported CVD and/or diabetes also yielded similar patterns, although associations were weaker probably due to the smaller sample size (data not shown).

Discussion

Most previous studies of alcohol consumption and quality of life focus on relatively heavy drinkers. This study of steady, but mostly moderate alcohol drinkers showed significant positive associations between the frequency and amount of alcohol intake and four of five quality of life measures, with similar patterns found in men and women. These observed associations were independent of age and lifestyle characteristics including exercise and cigarette smoking, as well as risk factors such as blood cholesterol levels, and chronic diseases such as diabetes and prevalent CVD.

Although others have suggested a positive association between quality of life and patterns of alcohol consumption [28] [29] [30], relatively few studies focused on older adults. Results of this study are in accord with those of Byles and collaborators [31], who examined 12,432 Australian women aged 70 to 75, and found that nondrinkers had poorer health-related QOL and that moderate alcohol use was good for mental health based on the SF-36. Lang and collaborators [32] studied 6005 UK men and women aged 50 and older, and concluded that moderate drinking (> 1 but < 2 drinks/day) was associated with better subjective well-being and depressed mood when compared to never or former drinkers. To our knowledge the present study is one of the largest using older US individuals to examine alcohol intake and four measures of QOL independent of common possible confounders.

Alcohol consumption is frequent in older adults the United States: 40% of women and 56% of men aged 65–74 are current drinkers [10]. Consumption of high amounts of alcohol can have a detrimental effect on health and recent guidelines by the American Cancer Association recommend that those who already drink alcoholic beverages should limit themselves to no more than two drinks per day for men and one drink per day for women [33]. In his early retrospective study of the association between alcohol with longevity among 5000 working class men and women, Pearl reported that low to moderate levels of daily alcohol intake were associated with increased overall survival in men aged 65 years and older when compared to non-drinkers [3]. A similar weaker pattern was observed for women who drank alcohol; at that time the majority of the women were non-drinkers. A recent meta-analysis of 28 cohort studies [2] found that a high alcohol intake was related to increased risk of coronary heart disease, regular moderate intake of alcohol (< 72 g/day) was cardioprotective, and that 25 g of alcohol/day (2 drinks/day) reduced coronary heart disease risk by 25% compared with abstinence. Numerous mechanisms have been proposed whereby which alcohol may exert its cardioprotective effects including raising HDL levels [34]; actions on platelet aggregatability [35], and lowering fibrinogen levels [36,37]. The effects of alcohol on quality of life might be mediated by its favorable effects on cardiovascular health, as a stress reliever, or as a factor associated with social support and networking.

Several characteristics of this cohort should be noted. The Rancho Bernardo Study cohort is Caucasian, relatively well educated (74% had some college education) and mostly middle- to upper-middle-class (more than 90% were classified as Hollingshead I–III); our findings may not apply to other ethnic and socioeconomic groups. However, the Rancho Bernardo population homogeneity (typical of many older suburbs) reduces confounding by socioeconomic status and ethnicity. In this study, we were unable to identify and separate those who were former drinkers from abstainers. Although some studies suggested that former drinkers differ from never drinkers [38], most found no differences [5] [39] [32]. Also we could not examine the effect of heavy drinking on quality of life because very few members of the Rancho Bernardo cohort could be classified as problem drinkers. Although alcohol intake in this study was self-reported, others found that simple self-administered questionnaires can provide useful estimates of alcohol intake [40], and that people in observational studies seen to have little reason to underreport their intake [41]. Furthermore, self-reported alcohol intake among

Rancho Bernardo participants was indirectly validated by parallel increases in high density lipoprotein cholesterol with increasing alcohol intake, a well known consequence of alcohol consumption [42,43].

As a guideline for promoting health, this study does not advocate unsafe, irresponsible, or heavy alcohol consumption in any form. In conclusion, this study shows that regular moderate alcohol use is associated with a perceived better quality of life in older individuals.

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Figure 1.

Beck Depression Inventory adjusted mean* (95% CI) by drinking categories (1=non drinker; 2=occasional drinker; 3= light regular; 4=moderate regular drinker)

* adjusted for age, BMI, regular exercise, smoking status, and estrogen use for women

Figure 2. QOL scales adjusted* means (95%CI) by drinking categories (1=non drinker; 2=occasional drinker; 3= light regular; 4=moderate regular drinker).

* adjusted for age, BMI, regular exercise, smoking status, and estrogen use for women

Table 1
Sample characteristics, Rancho Bernardo Study, 1992–1996

Characteristics	Men (n=633)	Women (n=961)	P value
	Mean (SD)*	Mean (SD)	
Age	71.7 (10.2)	72.0 (10.7)	0.59
BMI	26.3 (3.7)	24.7 (4.2)	<0.001
Alcohol(grams/week)	85.6 (100.8)	49.4 (66.8)	<0.001
Total Cholesterol (mg/dl)	199.1 (35.4)	216.3 (35.8)	<0.001
HDL (mg/dl)	48.7 (13.5)	64.4 (16.8)	<0.001
LDL (mg/dl)	125.2 (30.7)	127.7 (33.9)	<0.001
Triglycerides (mg/dl)	125.2 (94.6)	121.2 (68.2)	0.33
SGOT	20.7 (7.2)	19.7 (6.5)	0.003
SGPT	19.6 (9.6)	16.1 (8.2)	<0.001
Quality of Life Scores			
BDI	4.6 (3.9)	5.8 (4.6)	<0.001
QWB	0.71 (0.1)	0.69 (0.1)	0.01
SF-36	88.5 (21.3)	85.3 (23.9)	0.011
Mental health	78.9 (17.3)	75.5 (19.2)	0.001
Physical health	72.5 (21.1)	68.6 (22.7)	0.002
SWL-S	25.9 (5.8)	25.3 (6.0)	0.039
LSI-Z	20.6 (4.8)	20.3 (5.1)	0.20
	%	%	
Alcohol use			
Non drinker	10.7	17.0	0.00
< 3 times/week	35.4	43.3	
≥ 3 times/week, < 170 g/week	36.0	32.3	
≥3 times/week, ≥ 170 g/week	17.9	7.5	
CAGE	13.3	5.3	0.00
Exercise 3x/week	75.4	68.3	0.002
Hypertension	62.9	62.9	0.99
Diabetes History	7.9	4.9	0.01
Depression (BDI>13)	3.9	8.7	<0.001

* SD, standard deviation; HDL, high density lipoprotein; LDL, low density lipoprotein; SGOT, serum glutamic-oxaloacetic transaminase; SGPT, serum glutamate pyruvate transaminase; BDI, Beck depression inventory; QWB, quality of well being; SF-36, Medical Outcomes Study Short-Form 36; LSI-Z, Life Satisfaction Index-Z Scale; SWLS, Satisfaction with Life Survey

Table 2
Age and age-adjusted comparisons of characteristics by drinking status for men and women.

	Non Drinker	Occasional Drinker	Light Regular Drinker	Moderate Regular Drinker	P for trend
	Mean $\pm$ SE	Mean $\pm$ SE	Mean $\pm$ SE	Mean $\pm$ SE	
MEN	n=68	n=224	n=228	n=113	
Age	72.5(1.2)	71.4(0.7)	71.6(0.7)	72.0(1.0)	0.96
BMI	25.5(0.4)	26.5(0.2)	26.2(0.2)	26.7(0.3)	0.05
Alcohol (g/wk)	0.0	16.1(3.2)	93.7(3.2)	258.4(4.5)	<0.001
SGOT ^a	20.1(0.9)	20.3(0.5)	20.3(0.4)	22.4(0.7)	0.32
SGPT ^a	18.9(1.1)	19.3(0.6)	19.3(0.6)	21.4 (0.8)	0.13
T Cholesterol	193.0(4.2)	196.1 (2.3)	199.4 (2.3)	207.8 (3.3)	0.004
HDL	46.1 (1.6)	45.6 (0.9)	50.3 (0.9)	53.4 (1.2)	<0.001
LDL	121.9 (3.7)	124.0 (2.0)	126.0 (2.0)	128.2 (2.9)	0.14
	%	%	%	%	
Current smoker	6.0	3.1	4.8	9.8	0.21
Exercise 3x/week	78.0	70.1	79.4	76.1	0.86
Hypertension	63.2	62.5	59.6	69.9	0.33
Diabetes	16.2	16.7	12.5	19.5	0.74
CVD	34.4	31.6	29.9	26.3	0.22
Alcohol abuse ^b	23.9	6.1	12.3	23.1	0.80
Depression ^c	1.4	3.3	4.9	4.3	0.26
WOMEN	n=163	n=416	n=310	n=72	
Age	73.7(0.8)	72.0(0.5)	71.0(0.6)	73.5(1.3)	0.17
BMI	24.6(0.3)	25.3(0.2)	24.0(0.2)	24.9(0.5)	0.86
Alcohol (g/wk)	0.0	14.9(1.4)	80.3(1.7)	227.2(3.5)	<0.001
SGOT ^a	20.0(0.6)	19.5(0.3)	19.8(0.4)	19.3(0.8)	0.52
SGPT ^a	16.3(0.6)	15.9(0.4)	16.2(0.5)	16.6(1.0)	0.26
Cholesterol	208.7 (2.8)	216.1 (1.7)	219.4 (2.0)	221.2 (4.2)	0.008
HDL	59.4 (1.3)	61.6 (0.8)	69.9 (0.9)	67.5 (1.9)	<0.001
LDL	123.3 (2.6)	130.3 (1.7)	125.9 (1.9)	129.7 (3.9)	0.30

	Non Drinker	Occasional Drinker	Light Regular Drinker	Moderate Regular Drinker	P for trend
	Mean $\pm$ SE	Mean $\pm$ SE	Mean $\pm$ SE	Mean $\pm$ SE	
	%	%	%	%	
Current smoker	7.9	3.1	11.3	17.1	<0.001
Exercise 3x/week	66.1	67.3	74.3	52.6	0.095
Current estrogen	41.6	43.3	49.0	45.1	0.43
Hypertension	68.1	61.3	60.0	72.2	0.10
Diabetes	14.5	11.2	7.7	17.7	0.65
CVD	34.0	27.8	22.9	26.4	0.14
Alcohol abuse ^b	2.9	3.6	7.2	12.9	<0.001
Depression ^c	15.4	8.3	7.3	2.4	0.001

^a p-value based on log transformed variables

^b Alcohol abused was defined as positive answers on 2 or more CAGE questions

^c Beck Depression Inventory score $\geq$ 13

Table 3

Adjusted associations[†] of number of drinks in past week with scores on each quality of life measure and Beck Depression Inventory

	Men		Women	
QOL Measurements All Participants	β -values*	P-values	β -values	P-values
QWB	0.001	0.20	0.000	0.62
SF-36	0.307	0.003	0.173	0.25
Physical health	0.270	0.01	0.180	0.17
Mental health	0.220	0.01	0.154	0.19
SWLS	0.028	0.36	0.104	0.006
LSI-Z	0.07	0.009	0.101	0.002
BDI	-0.018	0.31	-0.076	0.004
Excluding alcohol abusers				
QWB	0.001	0.47	0.001	0.68
SF-36	0.262	0.02	0.250	0.11
Physical health	0.272	0.010	0.201	0.14
Mental health	0.202	0.024	0.199	0.11
SWLS	0.014	0.67	0.115	0.003
LSI-Z	0.055	0.04	0.117	0.001
BDI	-0.024	0.20	-0.082	0.004

[†] Analyses adjusted for age, BMI, current smoking, exercise, plus current estrogen use in women;

* results of multiple linear regression analysis with each quality of life measure and the BDI scores serving as the dependent variable in a separate analysis.