

# Does Mental Health Differ by Alcohol Use in Elderly Male Veterans?

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## Abstract

**Introduction:** With limited research for mental health and alcohol use among veterans in the general population and none for elderly male veterans only, the purpose is to assess whether mental health differs by alcohol use in elderly male veterans in the general population. **Method:** This cross-sectional analysis uses 2017 Behavioral Risk Factor Surveillance System data for male veterans aged 65 and older in general population samples from Florida ( $n = 1,700$ ), Maryland ( $n = 1,060$ ), New York ( $n = 552$ ), and Washington ( $n = 1,031$ ). Multiple logistic regression by state assessed the relationship between mental health and alcohol use, after controlling for health-related, demographic, and socioeconomic factors. **Results:** Across states, most participants reported good mental health (80%-84%) and more than half reported drinking (53%-63%). Adjusted results indicated that mental health did not differ by alcohol use in any state; however, it was related to physical health and activity limitations across states. **Conclusion:** Overall, alcohol use was not related to mental health in elderly male veterans in the general population; however, physical health status and activity limitations were. Practitioners should always screen for alcohol use and should automatically screen for mental health, physical health, and activity limitations when symptoms present for any and assess concurrent treatment and management strategies.

## Keywords

elderly, males, veterans, mental health, alcohol, activity limitations

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## Introduction

Mental health is a vital component of maintaining overall health and is a primary focus in public health (Centers for Disease Control and Prevention [CDC], 2008). In the United States, one in five adults have a mental health condition (CDC, 2008; National Academy of Medicine [NAM], 2015; Tarricone et al., 2011), but veterans have an even higher rate with one in three having some type of mental illness diagnosis (NAM, 2015; Statista, 2017). Even then, the prevalence may be higher than estimated because of the stigma associated with mental health diagnoses, services, and treatment (Williamson, Stevelink, Greenburg, & Greenburg, 2018). Furthermore, mental health is becoming an increasing concern because the majority of the veteran population is growing older (Williamson et al., 2018); mental health is related to mortality in veterans (Singh et al., 2005); and elderly veterans suffer from a higher suicide rate than younger veterans (NAM, 2015).

A variety of factors are related to mental health status. Research has shown that mental health is impacted

by health behaviors, such as smoking and physical inactivity (CDC, 2008; Tarricone et al., 2011), and medical conditions, including cardiovascular disease (Lazar, 2014) and arthritis (Singh et al., 2005). Mental health is also related to low socioeconomic status (CDC, 2008; Riola, Nguyen, Greden, & King, 2005; Seal, Bertenthal, Miner, Sen, & Marmar, 2007; Tarricone et al., 2011) and demographic factors, such as marital status (CDC, 2008; Seal et al., 2007) and gender (Riola et al., 2005; Seal et al., 2007). In addition, compared with the general population, veterans have unique life events that may adversely impact their mental health. Exposure to trauma, experiences of ongoing threat, and dysfunctional relationships after

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combat may be related to an increased risk for psychopathologies and mental health issues (Kitchiner, Roberts, Wilcox, & Bisson, 2012). Furthermore, activities of daily living (ADL) limitations and physical impairments (Knickerbocker, McElroy, & Hartos, 2017; Singh et al., 2005) have been shown to be related to lower mental health in veterans. Research has also shown that the lack of social support for military personnel (Kitchiner et al., 2012) could lead to an increased risk for mental health problems.

Furthermore, research has confirmed that substance abuse and substance use disorders are related to mental health in veterans (Jane-Llopis & Matytsina, 2006; Seal et al., 2011; Williamson et al., 2018), especially excessive alcohol consumption (Jane-Llopis & Matytsina, 2006). Excessive alcohol consumption is a major risk factor for illness, disability, and mortality (CDC, 2018a; Rehm, 2011), including infectious disease, cancer, diabetes, neuropsychiatric disease, cardiovascular disease, liver and pancreatic disease, unintentional and intentional injuries (CDC, 2018a; Rehm, 2011), and dementia (Schwarzinger, Pollock, Hasan, Dufouil, Rehm, & Baillet, 2018). Research suggests that U.S. military personnel consume more alcohol and have higher rates of binge drinking when compared with the general population, even after controlling for age and gender (Doherty et al., 2017). In addition, elderly male veterans have a higher prevalence of alcohol use disorders (5.4%) compared with elderly males in the general population (2.4%) (Williamson et al., 2018), and alcohol consumption is related to poor health in veterans (McDevitt-Murphy et al., 2010).

The increased prevalence of drinking and alcohol use disorders in the veteran population (Doherty et al., 2017; Williamson et al., 2018) is concerning because research has revealed that alcohol consumption can influence mental health status (Marti, Choi, DiNitto, & Choi, 2015; Rehm, 2011). In addition, high-volume drinkers and frequent binge drinkers are more likely to report psychological distress than those who are not high-volume drinkers or binge drinkers (Makela, Raitasalo, & Wahlbeck, 2015). Hazardous drinking has also been found to be related to mental health in veterans who utilize veteran services (McDevitt-Murphy et al., 2010; Seal et al., 2011). Despite these relationships, there are also conflicting findings regarding the link between alcohol abstinence and mental health (Marti et al., 2015; Skogen, Harvey, Henderson, Stordal, & Mykletun, 2009). One study suggests that being a non-alcohol consumer is related to an increased risk for anxiety and depression (Skogen et al., 2009). However, according to other research, lifetime abstainers from alcohol are less likely to have a major depressive episode than non-binge drinkers in elderly adults in the general population (Marti et al., 2015). In regard to veterans, research has shown that alcohol misuse is related to an increased incidence of depression (Hoge et al., 2004; Seal et al., 2011).

However, there is limited research on the relationship between alcohol use and mental health in veterans in the general population, as most studies include only veterans who utilize veteran services (McDevitt-Murphy et al., 2010; Seal et al., 2011; Singh et al., 2005; Williamson et al., 2018). Furthermore, there is no evidence of mental health status given solely for elderly male veterans (Kales, Blow, Bingham, Copeland, & Mellow, 2000; Knickerbocker et al., 2017; Riola et al., 2005; Seal et al., 2007; Singh et al., 2005; Williamson et al., 2018), as prior research tends to focus on younger adult veterans (Heltemes, Clouser, MacGregor, Norman, & Galarneau, 2014; Jakupcak et al., 2010) rather than elderly veterans and most studies do not report the prevalence of mental health by gender or age (Williamson et al., 2018). This gap in the literature is important to address so that health care providers can better screen for mental health issues in elderly male veterans. Therefore, the aim of this study is to determine whether mental health differs by alcohol use in elderly male veterans in the general population.

## Method

### Design

This cross-sectional analysis used 2017 data from the Behavioral Risk Factor Surveillance System (BRFSS) conducted by the CDC (2018b). BRFSS is an annual collection of health-related telephone survey data from all 50 states, including the District of Columbia and the three U.S. territories. Random digit dialing for both landlines and cellphones is used to survey adults 18 years or older about health-related risk behaviors, chronic health conditions, and use of health services. The CDC compiles the BRFSS data and makes deidentified data available for secondary data analysis. This study was given exempt status by the Institutional Review Board of The University of North Texas Health Science Center.

### Sample

The samples included elderly male veterans aged 65 and older ( $N = 4,343$ ) in general populations samples from Florida ( $n = 1,700$ ), Maryland ( $n = 1,060$ ), New York ( $n = 552$ ), and Washington ( $n = 1,031$ ) who answered "yes" to the question "Have you ever served on active duty in the United States Armed Forces, either in the regular military or in a National Guard or military reserve unit?" and had data for alcohol use and mental health status. These states were chosen for their higher prevalence of veterans based on the BRFSS 2016 prevalence survey data maps (CDC, 2018c). Although the response rates for veterans by state are unknown, the overall response rates by state for 2017 BRFSS data are reported as 46.5% for Florida, 38.3% for Maryland, 32.9% for New York, 39.6% for Washington (CDC, 2018d).

## Data

Our outcome of interest was mental health status. BRFSS initially measured mental health status by asking participants, "Now thinking about your mental health, which includes stress, depression, and problems with emotions, for how many days during the past 30 days was your mental health not good?" Responses were 0 to 30 days of "not good" mental health. However, because we are interested in good mental health, we reversed the values to reflect 0 to 30 days of "good" mental health. In all four states, the means for the variables were severely skewed (Florida:  $M = 27.40$ ,  $SD = 10.48$ ,  $R = 0-30$ ; Maryland:  $M = 28.02$ ,  $SD = 6.32$ ,  $R = 0-30$ ; New York:  $M = 27.86$ ,  $SD = 6.36$ ,  $R = 0-30$ ; Washington  $M = 27.76$ ,  $SD = 6.86$ ,  $R = 0-30$ ) and the mode in each state was 30 days. Therefore, we dichotomized good mental health as "yes" indicating 30 days of good mental health in the past 30 days and "no" indicating 0 to 29 days of good mental health in the past 30 days, that is, mental health issues in the last 30 days. For the factor of interest, alcohol use, BRFSS reported the average number of drink occasions per day, and we categorized this as "no drinking" (no alcohol consumption), "light drinking" (less than one alcoholic drink), "moderate drinking" (one to three drinks per day for females; one to four drinks per day for males), and "excessive drinking" (four or more alcoholic drinks per day for females; five or more alcoholic drinks per day for males) to measure different levels of alcohol consumption (CDC, 2018b).

The control variables were tobacco use, physical health status, health conditions, activity limitations, age, ethnicity and race, marital status, educational level, employment status, and income level. All variables and categories are shown in Table 1. We calculated health conditions as the number of "yes" responses to being diagnosed with any of the following: high blood pressure, high cholesterol, heart attack, coronary heart disease, stroke, skin cancer, cancer, chronic obstructive pulmonary disease, arthritis, depression, kidney disease, diabetes, and asthma. We then categorized values as "0 or 1 condition," "2 conditions," or "3 or more conditions." We calculated activity limitations as the number of "yes" responses to any of the following questions: "Are you deaf or do you have serious difficulty hearing?"; "Are you blind or do you have serious difficulty seeing, even when wearing glasses?"; "Because of a physical, mental, or emotional condition, do you have serious difficulty concentrating, remembering, or making decisions?"; "Do you have serious difficulty walking or climbing stairs?"; "Do you have difficulty dressing or bathing?"; and "Because of a physical, mental, or emotional condition, do you have difficulty doing errands alone such as visiting a doctor's office or shopping?" We then categorized values as "0 activity limitations," "1 activity limitation," and "2 or more activity limitations."

## Analysis

Frequency distributions by state were used to describe the samples and to find any issues with the distribution of variables. Multiple logistic regression analysis by state was used to assess the relationship between mental health (dichotomous) and alcohol use (categorical) after controlling for health-related, demographic, and socio-economic factors (all dichotomous or categorical). All analyses were conducted separately by state to assess patterns in relationships among the variables of interest in similar samples. Similar findings in three or four states out of the four states were considered evidence of reliable relationships. Any observations with missing data for any variables were excluded from adjusted analysis. All analyses were conducted in STATA 15.1 (Copyright 1985- 2017 StataCorp LLC).

## Results

### Participant Characteristics

Table 1 lists participant characteristics for elderly male veterans in general population samples from Florida, Maryland, New York, and Washington. Across states, most participants reported having good mental health in the past 30 days (80%-84%) and more than half reported drinking (53%-62%): light drinking (11%-13%), moderate drinking (13%-16%), and excessive drinking (28%-35%). For tobacco use, the majority were former smokers (56%-57%) and about one-third reported never smoking (33%-37%). For health status, the majority reported a high level of physical health in the past month (59%-66%), three or more health conditions (56%-61%), and no activity limitations (67%-77%). For demographic factors, about one-fourth were either 65 to 69 years old (23%-25%), 70 to 74 years old (27%-30%), 75 to 79 years old (18%-20%), or 80 years or older (26%-32%); most of the participants were White, non-Hispanic (85-92%); and the majority reported being married (54%-67%). For socioeconomic status, about half of the participants did not graduate college or technical school (51-62%), most were not employed (82%-89%), and about half reported an income of US\$50,000 or more (44%-63%). Variable proportions were similar across states, which is indicative of similar samples. Only income varied by more than 20% (for unknown reasons), but all control variables were used in models by state to determine relative variable relations in similar samples.

### Adjusted Statistics

As shown in Table 2, the results of multiple logistic regression analysis for elderly male veterans in general population samples from Florida, Maryland, New York, and Washington indicated that after controlling for all other variables in the model, mental health did not differ

**Table 1.** Participant Characteristics by State.

Variable	Florida (n = 1,700)		Maryland (n = 1,060)		New York (n = 552)		Washington (n = 1,031)	
	n	%	n	%	n	%	n	%
Mental health status	1,700	100	1,060	100	552	100	1,031	100
30 days	1,398	82	891	84	440	80	844	82
Less than 30 days	302	18	169	16	112	20	187	18
Alcohol use	1,700	100	1,060	100	552	100	1,031	100
No drinking	796	47	438	41	206	37	422	41
Light drinking	203	12	122	12	74	13	109	11
Moderate drinking	228	13	160	15	80	14	168	16
Excessive drinking	473	28	340	32	192	35	332	32
Tobacco use	1,613	95	1,006	95	530	96	994	97
Never smoked	529	33	372	37	182	34	345	35
Former smoker	922	57	575	57	300	57	558	56
Current smoker	162	10	59	6	48	9	91	9
Physical health status	1,663	98	1,034	98	537	97	1,013	98
Low	312	19	135	13	94	18	162	16
Moderate	283	17	216	21	128	23	213	21
High	1,068	64	683	66	315	59	638	63
Health conditions	1,548	91	978	92	510	92	952	92
0 or 1 condition	326	21	198	20	106	21	218	22
2 conditions	280	18	193	20	119	23	190	20
3 or more conditions	942	61	587	60	285	56	544	57
Activity limitations	1,605	94	996	94	522	95	965	95
0 limitations	1,072	67	765	77	377	72	714	74
1 limitation	309	19	152	15	100	19	155	16
2 or more limitations	224	14	79	8	45	9	96	10
Age	1,700	100	1,060	100	552	100	1,031	100
65-69	414	24	266	25	125	23	250	24
70-74	457	27	306	29	153	28	307	30
75-79	303	18	208	20	99	18	194	19
80 and older	526	31	280	26	175	32	280	27
Ethnicity/race	1,649	97	1,048	99	544	99	1,006	98
White, non-Hispanic	1,497	91	889	85	494	90	928	92
Other	152	9	159	15	50	9	78	8
Marital status	1,689	99	1,059	100	548	99	1,023	99
Married	964	57	710	67	298	54	658	64
Not married	725	43	359	33	250	46	365	36
Educational level	1,696	100	1,058	100	550	100	1,029	99
Graduated college	645	38	522	49	236	43	471	46
Did not graduate college	1,051	62	536	51	314	57	558	54
Employment status	1,696	100	1,058	100	549	99	1,028	100
Employed	194	11	191	18	78	14	136	13
Not employed	1,502	89	867	82	471	86	892	87
Income level	1,410	83	866	82	479	87	877	85
Less than US\$25,000	793	56	318	37	245	51	420	48
US\$50,000 or more	617	44	548	63	234	49	457	52

Note. The proportion for the variable is out of the total for the state; the proportion for each category is out of the total for the variable.

by alcohol use across states. However, compared with those who reported low physical health, participants who reported high physical health status were about 2.5 to 4 times more likely to report good mental health. In contrast, participants who reported two or more activity limitations were about 4 to 5 times less likely to report

good mental health compared with participants who reported no activity limitations. Table 3 shows self-reported activity limitations among elderly male veterans by state. The highest reported limitations included difficulties related to hearing (16%-29%) and walking (18%-27%).

**Table 2. Adjusted Results Across States.**

	Florida			Maryland			New York			Washington		
	AOR	95% CI		AOR	95% CI		AOR	95% CI		AOR	95% CI	
		Low	High		Low	High		Low	High		Low	High
Predicting good mental health (30 days vs. less)												
Alcohol use (ref: none)												
Light drinking	1.05	0.61	1.79	1.20	0.52	2.76	1.56	0.66	3.68	1.47	0.73	2.94
Moderate drinking	0.74	0.44	1.23	0.65	0.33	1.27	1.00	0.46	2.16	1.45	0.80	2.63
Excessive drinking	0.96	0.63	1.47	0.63	0.35	1.12	1.20	0.62	2.32	1.42	0.87	2.33
Physical health status (ref: low)												
Moderate vs. low	0.88	0.55	1.41	1.70	0.86	3.36	1.31	0.62	2.75	1.75	0.94	3.26
High vs. low	<b>2.49</b>	1.63	3.80	<b>4.15</b>	2.11	8.17	<b>2.81</b>	1.35	5.87	1.55	0.88	2.73
Activity limitations (ref: 0)												
1 limitation	<b>0.50</b>	0.33	0.76	<b>0.55</b>	0.30	0.99	0.77	0.36	1.61	0.66	0.38	1.16
2 or more limitations	<b>0.22</b>	0.14	0.35	<b>0.26</b>	0.12	0.57	<b>0.20</b>	0.08	0.49	<b>0.21</b>	0.11	0.40

Note. Boldface indicates significance (AORs with 95% CI that do not include 1.00 are significant); shown are the results for the factor of interest and any control variables that were significant in three or more states; the model also included tobacco use, health conditions, age, ethnicity/race, marital status, educational level, employment status, and income level. AOR = adjusted odds ratio; 95% CI = 95% confidence intervals; ref = referent group.

**Table 3.** Activity Limitations by Item and State.

Items	Florida		Maryland		New York		Washington	
	<i>n</i>	%	<i>n</i>	%	<i>n</i>	%	<i>n</i>	%
Are you deaf or do you have serious difficulty hearing?	481	29	182	18	87	16	53	21
Are you blind or do you have serious difficulty seeing, even when wearing glasses?	133	8	38	4	34	6	55	5
Because of a physical, mental, or emotional condition, do you have serious difficulty concentrating, remembering, or making decisions?	185	11	52	5	37	7	75	8
Do you have serious difficulty walking or climbing stairs?	433	27	188	18	114	21	207	21
Do you have difficulty dressing or bathing?	109	7	52	5	23	4	54	5
Because of a physical, mental, or emotional condition, do you have difficulty doing errands alone such as visiting a doctor's office or shopping?	125	8	51	5	37	7	62	6

## Discussion

The purpose of this study was to assess whether mental health differs by alcohol use in male veterans aged 65 and older in the general population when controlling for other variables that may be related to alcohol use. To our knowledge, this study is the first to explore this relationship in general population-based elderly male veterans. Across states, we found that most participants reported having good current mental health in the past 30 days and about half reported drinking, with about one-third reporting excessive drinking. Overall, the adjusted results indicated that mental health did not differ by alcohol use in elderly male veterans in the general population. These findings are contradictory to those of prior research, which suggest a strong relationship between mental health and alcohol use in both veterans and the general population (Hoge et al., 2004; Makela et al., 2015; McDevitt-Murphy et al., 2010; Rehm, 2011; Seal et al., 2011). These dissimilarities could be attributed to different measures and target populations. Notably, prior research focused on posttraumatic stress disorder (Heltemes et al., 2014; Jakupcak et al., 2010; McDevitt-Murphy et al., 2010), while our study measured general mental health status in the past 30 days. Previous research also investigated alcohol use disorders (Heltemes et al., 2014; Lazar, 2014) and alcohol use in younger veterans (Jakupcak et al., 2010), whereas our research focused on alcohol use in the past 30 days. In addition, prior research on mental health in veterans commonly used participants from Veterans Affairs' services (Kales et al., 2000; McDevitt-Murphy et al., 2010; Seal et al., 2007; Seal et al., 2011; Williamson et al., 2018), while our research used veterans in samples from the general population.

Overall, the results of our study indicated that current general mental health status in this target population may be better determined from comorbid conditions than from substance use. For example, across states,

participants who reported two or more activity limitations were much less likely to report good mental health compared with participants who reported no activity limitations, which is consistent with previous research (CDC, 2008; Knickerbocker et al., 2017). In this study, about one in five veterans reported difficulties related to hearing and walking. However, the extent to which these difficulties relate to prior military service, aging, or individual circumstance is unknown. Future research may want to address the relative contributions of these to activity limitations in elderly male veterans from general population samples. In addition, we found a strong relationship between mental health status and physical health status, which is a well-established relationship in the general population in prior research (Ohrnberger, Fichera, & Sutton, 2017; Surtees et al., 2008).

## Limitations

By using BRFSS data, we were able to analyze data from large representative samples of older adult male veterans in the general population, unlike other studies, which were limited to veterans in Veteran Affairs services (Heltemes et al., 2014; Kales et al., 2000; McDevitt-Murphy et al., 2010; Seal et al., 2007; Seal et al., 2011; Williamson et al., 2018). We were also able to measure current mental health, which includes individuals who may present with mental health symptoms without an official diagnosis. However, we had no information about severity of any mental health issues; treatment, management, or medication use related to mental health, physical health, or activity limitations; or alcohol content of drinks, all of which may impact the relations between alcohol use and mental health in the target population. Moreover, the accuracy of self-reported characteristics and health issues are unknown. However, this is the case for much of the patient-reported information practitioners must use in clinic.

## Conclusion

Because this was a population-based study, the results may be generalizable to elderly male veterans aged 65 and older in primary care settings. Practitioners may expect a low proportion of self-reported mental health issues and a moderate proportion of self-reported alcohol use in the past 30 days; however, these may not be related in this target population. Therefore, providers should screen, educate, and assess treatment options for mental health when patients present with symptoms. On the contrary, because of the moderate prevalence of self-reported alcohol use in elderly veterans and the recommendation for all primary care clinicians to screen all adults for alcohol misuse by the U.S. Preventive Services Task Force (2013), providers should always screen for alcohol use in this target population and educate patients about the health risks of excessive alcohol use. Referrals for substance abuse treatment should be made as needed. In addition, practitioners may expect a low proportion of elderly male veterans in the general population to report low physical health or activity limitations, but because both are highly related to mental health, practitioners should screen for all three if patients present with symptoms of any. Practitioners should educate this target population about the importance of co-managing mental health, physical health, and activity limitations; assess concurrent treatments for mental health, physical health, and activity limitations; and make referrals to specialists as needed. Future research may want to explore the extent to which mental health, physical health, and activity limitations in elderly male veterans from general population samples are related to prior military service, aging, or individual circumstance.

## Declaration of Conflicting Interests

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