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Does COPD differ by veteran status in males 50-79 years of age?

Kole P Knutson, Jordan M Stellato, Kelli R Vogler, Jourdan B Whorley, Vic Holmes and Jessica L Hartos*

Department of Physician Assistant Studies, University of North Texas Health Science Center, USA

Abstract

Purpose: With little research addressing veteran status as related to COPD, the purpose of this study is to assess whether COPD differs by veteran status in males ages 50-79 in the general population.

Methods: This study was a cross sectional analysis using 2016 BRFSS data for males ages 50-79 in Arkansas (N=1283), Montana (N=1586), New Jersey (N=1842), Tennessee (N=1473), and West Virginia (N=1854). Multiple logistic regression analyses were performed by state to determine whether COPD status differed by veteran status when controlling for age, ethnicity, tobacco use, weight status, general health, asthma, income, education, and employment.

Results: Across states, less than one-fifth of participants reported COPD (9-18%), and 25-40% reported veteran status. After controlling for socioeconomic, demographic, and health factors, results showed significant consistent relationships between COPD and veteran status in three out of five states. COPD was also consistently related to tobacco use, general health, and having ever been diagnosed with asthma in all 5 states.

Conclusion: The results of this study indicated that veteran males ages 50-79 are about two times more likely to have COPD when compared to non-veteran males of the same age in the general population. Due to the low prevalence of COPD overall, it is recommended that health care providers screen for COPD in this target population when patients present with symptoms, especially for current or ex-military personnel. In addition, COPD was highly related to smoking, general health, and asthma. Providers should identify and treat COPD and any other health conditions concurrently to make sure they are managed properly. Most importantly, as COPD is a disease of chronicity, providers should educate and refer smokers as early as possible for assistance with smoking cessation.

Introduction

Chronic Obstructive Pulmonary Disease (COPD) is defined as a progressive respiratory disease characterized by chronic airflow impedance [1-4]. COPD is not typically diagnosed until after lung function has already been nearly compromised [3] and it has been reported that an additional twelve million individuals are thought to be undiagnosed [5]. Past studies report that COPD could actually affect up to 16.8% of the population [4,6,7], and is a leading cause of death [2,3,8,9]. Additionally, several medical conditions have been reported as having a significant relationship with COPD including cardiovascular disease, ischemic heart disease, lung cancer, asthma, obesity, hypertension, diabetes, depression, anxiety, and obstructive sleep apnea [1,2,4,10,11].

Research has repeatedly indicated that COPD is highly related to tobacco use. Studies report that up to 90% of COPD patients identify as current or former smokers [1,2,4,5,9,12,13]. In addition, COPD patients are more likely to be white males [6-8,9,12] and have lower levels of income [7,12] and education [7,10].

COPD may also be related to veteran status. Several studies have determined the prevalence of COPD separately among the general population [6,12] and veteran population [13-16], but there is a lack of research comparing COPD status and veteran status [11,16]. One study, however, conducted at the Cincinnati Veterans Administration (VA) found that veterans had a higher rate of COPD when compared to the U.S. general population [16]. Furthermore, research has not adequately accounted for any age or gender differences in COPD status between these populations. Therefore, the purpose of this study was to assess whether COPD status differs by veteran status in males ages 50-79.

Methods

Design

This cross-sectional analysis used 2016 data from the Behavioral Risk Factor Surveillance System (BRFSS) conducted by the Center for Disease Control and Prevention (CDC) [17]. BRFSS collects health-related data annually through telephone interviews with adults in all fifty states, the District of Columbia, and three U.S. territories using random digit dialing techniques. The CDC compiles all BRFSS data and makes de-identified data available to researchers for secondary data analysis. This study was given exempt status by Institutional Review Board of The University of North Texas Health Science Center.

Sample

The samples for this study included males ages 50-79 from Arkansas (N=1,283), Montana (N=1,586), New Jersey (N=1,842), Tennessee (N=1,473), and West Virginia (N=1,854) with data for COPD. These states were chosen because they have a higher prevalence of veterans and reported COPD diagnosis when compared to other U.S. states [18].

Correspondence to: Jessica L Hartos, Department of Physician Assistant Studies, University of North Texas Health Science Center, 3500 Camp Bowie Blvd, Fort Worth, Texas, 76107, USA, Tel: (817) 735-2454, Fax: (817) 7352529, E-mail: Jessica.hartos@unthsc.edu

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Data

The outcome, COPD status, was measured as ever/never diagnosed with "chronic obstructive pulmonary disease, chronic bronchitis, and/or emphysema" in the participant's lifetime. The factor of interest, veteran status, was measured as ever/never on active duty in the armed forces including "regular, Guard, and Reserve."

The control variables included age, ethnicity/race, smoker status, BMI, general health, asthma, income level, education level, and employment status. Age was dichotomized as "50-64 years of age" versus "65-79 years of age." Since the majority of the participants reported their ethnicity as White, ethnicity/race was dichotomized as "white, non-Hispanic" versus "other." Smoker status was categorized as "never smoker," "former smoker," and "current smoker." BMI was dichotomized as "overweight or obese" versus "not overweight or obese." In BRFSS, general health is defined as "poor health," fair health," "good health," "very good health," and "excellent health"; however, due to low frequencies of participants with very good health and excellent health, four categories were used: "poor health," "fair health," "good health," and "very good/excellent health." Asthma was measured as ever/never being diagnosed with asthma. Income level was measured as an annual income of "$0 to less than $25,000," "$25,000 to less than $50,000," and "$50,000 or more." Education level was measured as yes/no graduated from college or technical school. Employment status was categorized as "wages/self-employed," "retired," or "other."

Analysis

Frequency distributions were used to describe the sample as well as to assess any issues with the distributions of variables. Multiple logistic regression analysis was used to assess the relationship between COPD status and veteran status while controlling for demographic, health, and socioeconomic factors. All analyses were conducted separately by state (instead of combining the data) to determine patterns in variable relations across similar samples. A similar finding in 3 or more out of 5 states was considered reliable evidence for a relationship. Any observations with missing data for any variables were excluded from the adjusted analysis. All analyses were conducted in STATA 15 (Copyright 1985-2017, StataCorp LLC).

Results

Descriptive statistics

Table 1 lists participant characteristics for males ages 50-79 in Arkansas, Montana, New Jersey, Tennessee, and West Virginia. Less than one-fifth of the participants reported ever being diagnosed with COPD (9-18%) and at least one fourth of the participants identified as veterans (25-40%). For demographic factors, approximately half of the participants were 50-64 years of age (42-56%) and most identified as white, non-Hispanic (74-94%). For health concerns, less than one-fifth reporting smoking (13-21%); the majority reported being overweight or obese (63-81%); over one-third reported very good/excellent health (35-49%); and few reported having been diagnosed with asthma (8-14%). For socioeconomic status, less than one-third of the participants reported an income of $0 to less than $25,000 per year (19-30%) or $25,000 to less than $50,000 per year (19-30%); the majority reported that they did not graduate college/technical school (54-72%); and about half reported working for wages or being self-employed (37-51%).

Adjusted statistics

As shown in Table 2, the results of multiple logistic regression analyses for males ages 50-79 indicated that after controlling for all other variables in the model, COPD status were significantly related to veteran status in 3 out of 5 states. Veterans were about 2 times more likely to report COPD than non-veterans. In addition, former smokers were about 3 times more likely, and current smokers were about 4.5 times more likely, to report COPD compared never-smokers in all five states. Also, those with asthma were about 4.5 times more likely to report COPD compared to those without asthma in all 5 states. In contrast, compared to those with poor health, those who reported fair, good, or very good/excellent health were about 2 to 11 times less likely to report COPD across states.

Discussion

The purpose of this study was to assess whether COPD status differed by veteran status in males ages 50-79 in the general population when controlling for demographic, health, and socioeconomic factors that may be related to COPD. Across states, less than one-fifth of participants reported ever being diagnosed with COPD, and at least one-fourth reported being a veteran. The results of adjusted analyses revealed that COPD status was significantly related to veteran status across states. These results are consistent with a study indicating that veterans may have higher rates of COPD than the general population [16]. In addition, our study found that being a former or current smoker was also significantly related to COPD status across all states, which is similar to many other studies that have reported strong relations between smoking and COPD [1,2,4,5,9,12,13]. Furthermore, our study supports the findings of other studies that indicate that fair or better health is inversely related to COPD [11,12] and asthma is highly related to COPD [7].

Smoking may contribute to the relationship between COPD and veteran status [19]. According to the CDC [20] veteran males have a higher prevalence of smoking than non-veteran males. However, even after controlling for smoking, veteran status still had a significant relationship with COPD. This would suggest that although smoking is related to COPD and veterans may smoke more than civilians, other factors related to veteran status contribute to COPD. Indeed, another study comparing COPD in different occupations found that serving in the armed forces was related to higher COPD rates than other occupations [14]. One such related factor may be higher exposure to hazardous agents in the military versus other occupations [14,19]. Future studies may want to include data for hazardous exposures that could contribute to veteran and non-veteran COPD status. Knowing whether or not people with COPD were exposed and/or continue to be exposed to hazardous agents could help practitioners screen earlier, modify treatment plans, and educate about reducing such exposures.

Limitations

Using BRFFS data allowed us to use state data most relevant to our clinical question. The large sample sizes allowed us to analyze the data based on the age and gender of our target population. However, our study findings may be limited by not having data for the severity of COPD, treatment modalities being used, or compliance with treatment plans [21]. Future studies should include such information. In addition, COPD rates in this study may be underreported given that millions of individuals in the US population may have COPD but no formal diagnosis [5]. Future studies may define COPD status by symptoms rather than diagnosis in order to incorporate patients living with undiagnosed COPD.

Table 1. Participant Characteristics by State

Variable	Arkansas		Montana		New Jersey		Tennessee		West Virginia	
	N=1283		N = 1586		N=1842		N = 1473		N = 1854	
	N	%	N	%	N	%	N	%	N	%
COPD diagnosis	1274	99	1576	99	1842	100	1464	99	1842	99
Yes	166	13	151	10	171	9	166	11	324	18
No	1108	87	1425	90	1671	91	1300	88	1518	82
Veteran status	1274	99	1576	99	1841	100	1464	100	1854	100
Yes	516	40	590	37	452	25	533	36	615	33
No	766	60	988	63	1389	75	935	64	1239	67
Age	1283	100	1586	100	1842	100	1473	100	1854	100
50-64	612	48	848	53	774	42	820	56	1047	56
65-79	671	52	738	47	1068	58	653	44	807	44
Ethnicity	1266	99	1561	98	1778	97	1440	98	1825	98
White, non-Hispanic	1019	80	1354	87	1391	78	1217	84	1,23	94
Other	247	20	207	13	387	22	234	16	106	6
Tobacco use	1241	97	1552	98	1782	97	1420	96	1814	98
Never smoked	502	41	683	44	873	49	577	41	704	39
Former smoker	511	41	632	41	656	37	564	40	735	41
Current smoker	228	19	237	16	253	14	279	20	375	21
Weight status	957	75	1199	76	1754	95	1099	75	1455	78
Overweight or obese	957	77	1199	78	1373	78	1099	77	1455	81
Not overweight or obese	278	23	344	22	381	22	325	23	338	19
General Health	1280	100	1581	100	1835	100	1471	100	1846	100
Poor	140	11	110	7	92	5	144	10	221	12
Fair	250	20	255	16	266	15	263	18	380	21
Good	446	35	497	31	584	32	500	34	600	33
Very good/excellent	444	35	719	45	893	49	564	38	645	35
Asthma	1282	100	1580	100	1837	100	1466	100	1846	100
Ever diagnosed	126	10	163	10	150	8	166	11	211	11
Never diagnosed	1156	90	1417	90	1687	92	1300	89	1635	89
Income	1084	84	1391	88	1555	84	1255	85	1554	84
$0 to less than $25,000	294	27	348	25	293	19	353	28	469	30
$25,000 to less than $50,000	274	25	403	29	289	19	360	29	460	30
$50,000 or more	516	48	640	46	973	63	542	43	625	40
Education	1278	100	1581	100	1833	100	1469	100	1850	100
Graduated college/technical school	455	36	543	34	851	46	477	32	521	28
Did not graduate college/technical school	823	64	1038	66	982	54	992	68	1329	72
Employment	1281	100	1574	99	1823	99	1462	99	1851	100
Wages/self-employed	469	37	802	51	917	50	637	44	688	37
Other	226	18	172	11	254	14	259	18	388	21
Retired	586	46	600	38	652	36	566	39	775	42

Table 2. Adjusted Results by State

Predicting COPD (diagnosis vs. no diagnosis)	Arkansas			Montana			New Jersey			Tennessee			West Virginia		
	AOR	95% CI		AOR	95% CI		AOR	95% CI		AOR	95% CI		AOR	95% CI	
		Low	High		Low	High		Low	High		Low	High		Low	High
Veteran Status															
Non-veteran	ref	-	-	ref	-	-	ref	-	-	ref	-	-	ref	-	-
Veteran	**1.88**	1.21	2.95	**2.38**	1.48	3.81	**2.01**	1.23	3.17	1.31	0.86	1.99	0.94	0.66	1.33
Age															
50-64	ref	-	-	ref	-	-	ref	-	-	ref	-	-	ref	-	-
65-79	0.87	0.75	2.26	1.45	0.83	2.54	0.94	0.55	1.61	0.98	0.6	1.61	**0.59**	0.39	0.91
Ethnicity															
Other	ref	-	-	ref	-	-	ref	-	-	ref	-	-	ref	-	-
White, non-Hispanic	1.31	0.75	2.26	**2.19**	1.17	4.13	**2.02**	1.18	3.47	1.43	0.84	2.43	**0.46**	0.25	0.84
Tobacco Use															
Never	ref	-	-	ref	-	-	ref	-	-	ref	-	-	ref	-	-
Former	**2.86**	1.62	5.06	**3.94**	2.14	7.26	**2.75**	1.63	4.63	**2.76**	1.57	4.85	**2.83**	1.82	4.34
Current	**4.59**	2.43	8.68	**6.37**	3.19	12.71	**4.35**	2.43	7.78	**5.34**	2.93	9.75	**5.54**	3.45	8.88
Weight Status															

Not overweight or obese	ref	-	-	ref	-	-	ref	-	-	ref	-	-	ref	-	-
Overweight or obese	1.29	0.8	2.1	1.02	0.6	1.72	1.23	0.75	2.02	1.07	0.67	1.7	1.17	0.79	1.74
General Health															
Poor	ref	-	-	ref	-	-	ref	-	-	ref	-	-	ref	-	-
Fair	**0.37**	0.2	0.66	**0.5**	0.26	0.96	0.78	0.41	1.48	**0.53**	0.3	0.95	0.72	0.46	1.12
Good	**0.17**	0.09	0.32	**0.32**	0.17	0.63	**0.22**	0.11	0.43	**0.35**	0.2	0.63	**0.29**	0.18	0.47
Very good/excellent	**0.09**	0.04	0.19	**0.15**	0.07	0.31	**0.14**	0.07	0.28	**0.18**	0.09	0.38	**0.1**	0.06	0.19
Asthma															
Never diagnosed	ref	-	-	ref	-	-	ref	-	-	ref	-	-	ref	-	-
Ever diagnosed	**4.62**	2.67	7.99	**8.74**	5.22	14.63	**9.78**	5.86	16.32	**4.72**	2.92	7.61	**4.85**	3.21	7.33
Income															
$0 to less than $25,000	ref	-	-	ref	-	-	ref	-	-	ref	-	-	ref	-	-
$25,000 to less than $50,000	1.03	0.6	1.78	**0.51**	0.29	0.89	**0.52**	0.29	0.94	0.72	0.44	1.17	1.03	0.68	1.54
$50,000+	0.75	0.41	1.35	0.69	0.38	1.24	0.61	0.35	1.07	0.63	0.35	1.13	0.82	0.51	1.33
Education															
Did not graduate college/ tech school	ref	-	-	ref	-	-	ref	-	-	ref	-	-	ref	-	-
Graduated college/tech school	1.05	0.62	1.77	0.99	0.6	1.65	**0.53**	0.32	0.88	0.95	0.55	1.64	0.76	0.48	1.19
Employment															
Wages/self-employed	ref	-	-	ref	-	-	ref	-	-	ref	-	-	ref	-	-
Other	1.27	0.63	2.58	**2.15**	1.1	4.18	1.13	0.60	2.12	**3.52**	1.87	6.63	1.4	0.85	2.32
Retired	1.51	0.82	2.78	**2.01**	1.1	3.67	1.38	0.78	2.42	**2.45**	1.32	4.56	1.27	0.79	2.04

Conclusion

Because this is a population-based study, the results may generalize to men between the ages of 50-79 in primary care settings. Different results may be found in the Veteran Administration or pulmonology settings. Primary care providers may expect less than one-fourth of their patients in this target population to have a COPD diagnosis, with higher prevalence related to (a) undiagnosed persons and (b) current or former military. Health care providers should screen for COPD if patients in this target population present with symptoms of COPD such as chronic cough, shortness of breath, fatigue, wheezing, and/or frequent respiratory infections, with particular consideration for veterans. Primary care providers should work closely with pulmonology specialists in treatment plans for COPD. In addition, because there is a moderate prevalence of smokers within the target population and there is a high relation between smoking and COPD, providers should screen for both when patients present with symptoms of either. Providers should encourage, and provide resources for, tobacco cessation to reduce severity or complications for COPD or other health issues related to smoking. Lastly, because few patients in this target population have asthma, but asthma and COPD are highly related, providers should screen for both when patients present with symptoms of either. Providers should determine whether the patient's asthma is properly managed or if better management strategies or referrals are needed.

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