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RESEARCH ARTICLE

Chronic Physical and Mental Health Conditions Associated With Employment Status in Veterans



Kavita Mosalpuria, PhD,^{1,2,3} Elise V. Bailey, BS,^{2,4} Hyunkyu Ko, PhD,⁵ Eric J. Hansen, BS,^{2,4} Fernando A. Wilson, PhD^{1,2,6}

Introduction: Veterans commonly experience both poor health and employment difficulty. However, the research examining potential relationships between chronic physical and mental health conditions and employment in veterans has important limitations. This study examines those potential relationships using large-scale, nationally representative data. The authors' hypothesis was that veterans experiencing these conditions would be less likely to be employed than veterans without the conditions and, further, that there may be differences in these relationships when comparing male veterans with female veterans.

Methods: The study team conducted a pooled cross-sectional analysis of nationally representative data from the 2004–2019 administrations of the Medical Expenditures Panel Survey, which had items addressing health conditions, employment, and military experience. The authors assessed the relationship between health conditions and employment using multivariate logistic regression. Control variables included demographics, SES, family size, and survey year.

Results: Veterans experiencing diabetes, high blood pressure, stroke, emphysema, arthritis, serious hearing loss, poor self-reported mental health, poor self-reported health, depression, or psychological distress were less likely to be employed than veterans without those conditions, even after adjusting for potential confounding factors. Veterans with diabetes had 25% lesser odds of being employed than veterans without the condition (95% CI=0.65, 0.85). Veterans with increased likelihood of depression had 35% lesser odds of being employed than veterans without depression (95% CI=0.52, 0.81).

Conclusions: This study adds evidence to the understanding of the role of chronic health conditions in employment status of veterans. The results support arguments for programs that aid veterans with both their health and their employment.

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INTRODUCTION

According to the U.S. Department of Labor, there were 18.5 million men and women veterans in 2021.¹ The veterans represent about 7% of civilian non-institutionalized U.S. adults.¹ Veterans are more qualified and skilled than civilian population because they have higher access to education and training opportunities; yet, they perform at the same level or more poorly in employment status.^{2,3} About 66% of men and 58% of women veterans

From the ¹Matheson Center for Health Care Studies, The University of Utah, Salt Lake City, Utah; ²Department of Population Health Sciences, School of Medicine, University of Utah, Salt Lake City, Utah; ³Department of Public Health, Brody School of Medicine, East Carolina University, Greenville, North Carolina; ⁴College of Social and Behavioral Science, The University of Utah, Salt Lake City, Utah; ⁵Department of Orthopedics, School of Medicine, University of Utah, Salt Lake City, Utah; and ⁶Department of Economics, College of Social and Behavioral Science, The University of Utah, Salt Lake City, Utah

Address correspondence to: Kavita Mosalpuria, PhD, Department of Public Health, East Carolina University, Greenville 115 Heart Drive, MS 660, Greenville NC 27834. E-mail: mosalpuria23@ecu.edu.

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reported deployment-related injuries.⁴ Veterans often face emotional traumatic experiences.⁵ Besides experiencing service-related injuries, veterans experience an array of health conditions. Some of these health conditions are known to impair functional health and predispose veterans to other comorbidities. Combat experience has been known to increase the likelihood of chronic conditions such as stroke, arthritis, asthma, and lung disease.^{6,7} A study found connections between deployment to Iraq or Afghanistan and new-onset asthma.⁸ Other diseases prevalent among U.S. veterans include hearing loss, depression, and post-traumatic stress disorder (PTSD).⁹ In general, people with hearing loss are predisposed to dementia, diabetes, cardiovascular diseases, anxiety, anger, frustration, paranoia, social isolation, and loneliness.³ Mental health disorders such as depression and PTSD are strongly associated with emotional, psychological, and social impairment such as feeling low in energy and limitation in social activities.⁹ Veterans with PTSD and major depressive disorder frequently have comorbidities with substance use, cardiovascular heart diseases, decreased employment and work productivity, marital and family dysfunction, and homelessness.¹⁰ Women veterans have lower risk than men of traditional cardiovascular risk factors and higher risk of nontraditional cardiovascular risk factors.⁴ These long-term health conditions impair the functional health and health-related quality of life in veterans.⁹

A considerable number of combat veterans find it arduous to transition from military to civilian life.^{5,11} Veterans who experienced psychological trauma, served in a combat zone, or served in the post-9/11 period faced steeper odds of an easy re-entry.⁵ Employment has been associated with many psychological and physical health benefits beyond greater economic stability and satisfaction with life.¹² Therefore, employment status has often been viewed as a metric of a successful transition to civilian life. Yet, employment is one of the most common challenges faced by veterans in their economic reintegration to civilian life.^{13,14} Even though 75% or more had an education level of some college, only 44.8% of all veterans were employed, according to the 2018 American Community Survey.¹⁵ Diagnosis of depression was related to higher unemployment in this population.^{16,17} Another found reduced employability in veterans with traumatic brain injury and psychological trauma because these conditions negatively impact the emotional, physical, and cognitive functioning.^{5,18}

Given this, a lot of research has been concentrated around how service-related health conditions affect employment status among veterans. Only some studies investigated the increased incidence of cardiovascular diseases and mental health conditions after exposure to

combat.¹⁹ It is well known that chronic diseases reduce the chances of employment.²⁰ Very little is known whether veterans with or without service-related illness were at greater disadvantage at employment because of their increased risk of chronic diseases.²⁰ Several cardiometabolic diseases, such as diabetes, hypertension, or stroke, have been studied individually for their impact on veteran employment. No study has examined predictors that included diagnosis of cardiometabolic diseases by a healthcare professional, survey questions screening depression and psychological distress using standardized indices, and self-reporting of health status for veterans in a single project. Having these varied dimensions of the health of veterans and comparing them with a reference of the U.S. adult civilian population help to confirm and emphasize the penalties that veterans pay in their employment status. The main aim of the present study is to explore the relationship between cardiometabolic conditions, mental and psychological screening indices, and self-reported health status and employment status in U.S. veterans using nationally representative data collected between 2004 and 2019. Secondly, the authors aimed to compare results (1) between civilian non-institutionalized U.S. adults and U.S. veterans and (2) between male and female veterans. The authors hypothesized that the presence of chronic health conditions and self-reported poor health status would be associated with reduced odds of employment among veterans. This study will contribute to the body of knowledge around health factors that may impact the employment status of U.S. veterans and potentially help in development of more effective support programs for veterans.

METHODS

Study Sample

Data were sourced from 2004 through 2019 administrations of the Medical Expenditure Panel Survey (MEPS) Household Component, which surveys a subsample of households participating in the previous year's National Health Interview Survey. The survey is designed in panels, consisting of 5 rounds of interviews over 2 full calendar years. For 1 full calendar year of the Household Component, 2 panels are combined. The Agency for Healthcare Research and Quality collects and maintains MEPS data. Data collection methods for the survey are described elsewhere.²¹ MEPS Household Component consists of nationally representative data on respondent's health status, access to care, demographic and socioeconomic factors, satisfaction with health care, and employment.

In this study, the authors restricted the sample to respondents who were aged ≥ 20 years and replied to

questions on employment status and veteran status. For the main analysis, the study team examined the relationships between the variables of interest among those who indicated that they were veterans. To observe the differences between veterans and the general U.S. adult population, the team conducted person-level analysis for both samples. They conducted subsample analysis for male and female veterans.

Measures

The dependent variable in this study was a person-level indicator of employment status. All persons aged ≥ 16 years at the time of the interview were asked their employment status. There were 4 allowable responses: currently employed (1), has a job to return to (2), employed during the reference period (3), and not employed with no job to return to (4). For this study, the authors recoded the responses into 2 mutually exclusive categories: 1, employed, if the respondents chose the first 3 allowable responses, and 0, unemployed (including not in the labor force), if the respondents chose the last allowable response. People not in the labor force can still be working by performing voluntary work or taking care of their children, elderly relatives, or others.²² Because there is limited information available on reasons for their choice to stay out of the labor force, the authors categorized them under unemployed. Those who responded as *don't know* or refused or were aged < 16 years were considered missing, as detailed in the data document.²¹

The study team constructed the veteran status from MEPS through various survey questions from 2004 to 2019 data. In MEPS 2017, veteran status was constructed using a question on honorably discharged and active-duty status. In 2018 and 2019 MEPS, veteran status was coded as inapplicable for people who were aged ≥ 59 years. In 2004, MEPS had survey question asking if respondents served in the armed forces. The authors coded the veteran status as 0 (not veteran, not on active duty, or did not serve) and 1 (veteran, or on active duty, or served in at least 1 round).

For the main and subsample analysis, the study team used 12 primary independent variables describing various chronic health conditions and health status. Eight were binary variables representing whether respondents had been diagnosed with the following conditions: diabetes, high blood pressure (HBP), asthma, any heart condition (including coronary heart disease, angina, myocardial infarction), stroke, emphysema, arthritis, or serious hearing loss. The authors also included perceived health status and perceived mental health status, which were recoded as 0 (fair and poor) or 1 (excellent, very good, and good). The final 2 primary independent

variables were the Kessler index (K6) of nonspecific psychological distress and the Patient Health Questionnaire 2 (PHQ-2) for depression symptoms. The Kessler index consists of 6 mental health–related questions. The respondents were asked to recall how distressed they felt in the last 30 days and to scale it from 0 to 4, with 0 meaning none of the time and 4 meaning all the time. The range of values will be 0–24 if the answers from all 6 questions are added.²³ High values on the K6 are associated with mental disability.^{23,24} The PHQ-2 index is the summation of responses from 2 questions that assess frequency of depressed mood and decreased interest in usual activities in the past 2 weeks.²⁴ Response options for each PHQ-2 item are *not at all*, *several days*, *more than half the days*, and *nearly every day*, scored as 0, 1, 2, and 3, respectively. The score ranges from 0 to 6. As per Kroenke et al.,²⁴ a score of 4 or greater was considered as someone having a higher tendency of depression. Thus, tendency of depression was coded 0 (PHQ-2 values of 1–3), or lesser tendency of depression, and 1 (PHQ-2 values of 4–6), or higher tendency of depression.

The authors also controlled for sociodemographic factors such as age (20–34 years, 35–64 years, ≥ 65 years), sex (male, female), race/ethnicity (non-Hispanic White [NHW], non-Hispanic Black [NHB], Hispanic, other or multiracial), marital status (married, unmarried), family size (1 person, 2 people, > 2 people), education (less than high school, high school or GED, some college, college or higher), and poverty status ($< 100\%$ of Federal Poverty Level [FPL], 100%–125% FPL, 125%–200% FPL, 200%–400% FPL, $> 400\%$ FPL) as percentage of the FPL.

Statistical Analysis

The authors conducted univariate analysis to examine the distribution of each variable in the data, along with Pearson chi-square tests to see the differences between subpopulations in the data. Multivariable logistic regression was conducted to test the primary objective. The authors then conducted several subanalyses using multivariable logistic regression for male and female veterans. All regression models were adjusted for survey year and weighted using person-level sample weights to account for sampling design, oversampling, and survey nonresponse and to produce nationally representative estimates.²¹ The authors produced national-level estimates using the *svyset* command of Stata. MEPS is a publicly available data set that has deidentified information of the respondents. Thus, this study was exempt from IRB review. A 2-sided alpha < 0.05 was considered significant, and we applied a Bonferroni-adjusted *p*-value to denote statistical significance of multiple comparisons. Analysis was performed in March 2022 using Stata/MP 17.0 (Stata Corp., College Station, TX).

RESULTS

Table 1 shows sample characteristics of MEPS respondents who provided information on employment and veteran status from 2004 to 20019. Table 2 highlights the AORs for employment status by the total sample, all veterans, male veterans, and female veterans. The total sample consisted of 298,115 respondents; 60.4% were employed, and 8.3% were veterans. More than half of this population were females (52.2%) and were in the age group of 34–64 years (53.8%). Majority of this sample was constituted of NHW (67.3%). HBP (32%) and arthritis (25.2%) were the most prevalent chronic condition in this sample. The majority of the sample experienced moderate psychological distress (62.4%).

In the general U.S. adult population, the number of veterans unemployed (11.3%) was more than the number employed (6.3%). Less than half of females were employed (47.3%). Majority of NHW (67.6%) and Hispanic (14.3%) individuals were employed compared with being unemployed. A higher number of people with some college (29.9%) or college-level (27.1%) education were employed. The prevalence of all chronic conditions was lower among the employed. Higher proportions of people who were employed had HBP (54.6%) and asthma (76.5%) than those who were unemployed. In the general U.S. adult population, after adjusting for all the covariates, veterans were 23% less likely to be employed (95% CI=0.65, 0.73) than nonveterans. Females were 42% less likely to be employed (95% CI=0.56, 0.60) than males. As expected, people in the age group of 34–64 years were 1.48 times (95% CI=1.43, 1.54) more likely to be employed than those in the age group of 20–34 years. NHB (AOR=1.07; 95% CI=1.03, 1.12) and Hispanic (AOR=1.20; 95% CI=1.43, 1.54) individuals were more likely to be employed than NHW individuals.

The veteran sample consisted of 21,237 individuals. Of those, 9,415 (44.3%) were employed. About 10% of employed veterans were females. More than three fourths of employed veterans were NHWs. Veterans with HBP had 14% lesser odds of being employed than their peers without HBP (95% CI=0.77, 0.97). Veterans with diabetes had 25% lesser odds of being employed than those without diabetes (95% CI=0.65, 0.85). Veterans with stroke or emphysema had 36% (95% CI=0.49, 0.83) and 46% (95% CI=0.40, 0.72) lesser odds, respectively, of being employed than veterans without those conditions. Veterans with serious hearing loss were 20% less likely to be employed than those without (95% CI=0.68, 0.93). Veterans with poor self-reported mental or physical health had 42% (95% CI=0.49, 0.69) and 34% (95% CI=0.58, 0.77) lesser odds, respectively, of

employment than their peers without those conditions. Veterans with moderate psychological distress were 13% less likely to be employed than veterans with no distress (95% CI=0.78, 0.96), whereas veterans with severe psychological distress had 56% lesser odds of employment than their peers with no distress (95% CI=0.32, 0.60).

Marital status was associated with 51% (AOR=0.49; 95% CI=0.34, 0.70) lesser odds of employment in female veterans. The dose–response relationship between severity of psychological distress and employment was more pronounced in female veterans than in male veterans. In male veterans, those with moderate psychological distress were 13% less likely to be employed and those with severe psychological distress were 54% less likely to be employed than male veterans with no distress (95% CI=0.78, 0.97 and 95% CI=0.33, 0.63, respectively). In female veterans, those with moderate psychological distress were 27% less likely to be employed, and those with severe psychological distress were 75% less likely to be employed than female veterans with no distress (95% CI=0.55, 0.96 and 95% CI=0.12, 0.52, respectively) (Table 2 and Figures 1 and 2)

DISCUSSION

To the authors' knowledge, this study is one of few that explores the relationship of multiple health conditions, various self-reported health statuses, and mental and psychological distress indices with employment status in veterans using national-level data spanning over 16 years. Previous literature has either studied the relationship for only 1 or 2 health conditions, or the health conditions that were studied were only service related. Most studies had small sample that was collected over a few months or years. In addition, this study also compared the results between the general U.S. population and veterans. The comparison helps to identify the extent to which veterans having similar health conditions and extraneous factors face worse employment status.

In the U.S. and across the world, the prevalence of chronic conditions has increased. These results are broadly consistent with previous literature, which shows that chronic health conditions such as diabetes, hypertension, heart conditions, arthritis, depression, and anxiety affect the chances of employment in the general U.S. population and veterans. People with diabetes have higher healthcare expenditures and poorer quality of life.²⁵ Females with diabetes have a 4.4% lower probability of working than those without diabetes, and males have 7.1% lower probability of working.²⁰ A study on Veterans Affairs primary care patients found that patients with depression or anxiety were less likely to be employed, had lower levels of job search self-efficacy,

Table 1. Weighted Descriptive Statistics by Employment Status in U.S. Adults, 2004–2019 MEPS

Variables	Total sample	U.S. adults		p-value	Veterans		p-value
		Unemployed	Employed		Unemployed	Employed	
<i>n</i>	298,115	129,484	168,631		11,822	9,415	
Employment status							
Employed	60.4%	—	—				
Veteran status							
Veteran	8.3%	11.3%	6.3%	<0.001	—	—	
Chronic conditions							
Diabetes	9.4%	14.8%	5.9%	<0.001	22.5%	10.5%	<0.001
HBP	32.0%	44.1%	24.1%	<0.001	62.5%	40.2%	<0.001
Asthma	10.2%	11.9%	9.1%	<0.001	8.4%	6.6%	<0.002
Any heart condition	0.6%	1.2%	0.2%	<0.001	3.3%	0.7%	<0.001
Stroke	3.4%	6.9%	1.1%	<0.001	11.8%	2.7%	<0.001
Emphysema	2.0%	4.1%	0.6%	<0.001	8.2%	1.8%	<0.001
Arthritis	25.2%	38.3%	16.7%	<0.001	49.2%	27.7%	<0.001
Serious hearing loss	6.7%	10.9%	3.9%	<0.001	24.8%	11.0%	<0.001
Health status							
Poor self-reported mental health	13.2%	21.7%	7.7%	<0.001	20.6%	7.9%	<0.001
Poor self-reported health	21.6%	33.5%	13.8%	<0.001	35.5%	16.3%	<0.001
PHQ-2 depression screening	7.8%	13.1%	4.4%	<0.001	11.9%	3.9%	<0.001
Kessler index (K6)							
0, no psychological distress	33.1%	28.9%	35.8%	<0.001	31.4%	39.5%	<0.001
1–12, moderate	62.4%	62.9%	62.0%	<0.001	61.7%	58.7%	<0.001
≥13, severe	4.6%	8.2%	2.2%	<0.001	6.9%	1.8%	<0.001
Age, years							
20–34	28.1%	23.9%	30.8%	<0.001	3.5%	10.7%	<0.001
34–64	53.8%	38.2%	64.0%	<0.001	25.8%	72.4%	<0.001
≥65	18.1%	37.9%	5.2%	<0.001	70.7%	17.0%	<0.001
Sex							
Female	52.2%	59.7%	47.3%	<0.001	5.8%	9.5%	<0.001
Race/ethnicity							
NH White	67.3%	66.8%	67.6%	<0.001	84.3%	76.8%	<0.001
NH Black	11.1%	12.0%	10.5%	<0.001	8.5%	12.6%	<0.001
Hispanic	14.0%	13.6%	14.3%	<0.001	3.7%	5.8%	<0.001
Multiracial/others	7.6%	7.6%	7.6%	<0.001	3.5%	4.8%	<0.001
Marital status							
Married	55.2%	50.3%	58.4%	<0.001	63.2%	67.0%	<0.001
Family size							
1 person	21.8%	24.3%	20.2%	<0.001	27.6%	21.6%	<0.001
2 persons	33.2%	38.1%	30.1%	<0.001	57.3%	41.0%	<0.001
>2 persons	45.0%	37.6%	49.8%	<0.001	15.2%	37.5%	<0.001
Education							
Less than HS	12.0%	18.3%	7.8%	<0.001	9.1%	2.1%	<0.001
HS	37.5%	41.0%	35.2%	<0.001	43.0%	40.1%	<0.001
Some College	27.7%	24.5%	29.9%	<0.001	27.6%	34.8%	<0.001
College	22.7%	16.1%	27.1%	<0.001	20.3%	23.0%	<0.001
Income FPL							
<100%	11.0%	21.0%	4.4%	<0.001	9.9%	1.9%	<0.001
100 to <125%	4.1%	6.5%	2.5%	<0.001	4.9%	1.3%	<0.001
125 to <200%	12.8%	16.6%	10.4%	<0.001	14.9%	6.6%	<0.001
200 to <400%	29.9%	27.1%	31.7%	<0.001	31.0%	28.6%	<0.001
≥400%	42.2%	28.8%	51.0%	<0.001	39.3%	61.7%	<0.001

FPL, Federal Poverty Level; HBP, high blood pressure; HS, high school; MEPS, Medical Expenditure Panel Survey; NH, non-Hispanic; PHQ-2, Patient Health Questionnaire 2.

Table 2. AOR From Multivariable Regression for Employment Status, 2004–2019 MEPS

Characteristics	All		Veterans (all)		Veterans (males)		Veterans (females)	
	AOR	p-value	AOR	p-value	AOR	p-value	AOR	p-value
<i>n</i>	298,115		21,237		19,431		1,805	
Veteran	0.69 (0.65, 0.73)	<0.001	—		—		—	
Sex								
Female	0.58 (0.56, 0.60)	<0.001	0.83 (0.68, 1.01)	0.058	—		—	
Age, years								
20–34	ref		ref		ref		ref	
34–64	1.48 (1.43, 1.54)	<0.001	0.94 (0.77, 1.14)	0.511	0.88 (0.71, 1.09)	0.229	1.15 (0.78, 1.68)	0.489
≥65	0.12 (0.11, 0.13)	<0.001	0.07 (0.06, 0.09)	<0.001	0.07 (0.06, 0.09)	<0.001	0.05 (0.03, 0.09)	<0.001
Race/ethnicity								
NH White	ref		ref		ref		ref	
NH Black	1.07 (1.03, 1.12)	0.001	1.14 (0.98, 1.32)	0.081	1.13 (0.96, 1.33)	0.136	1.10 (0.84, 1.44)	0.469
Hispanic	1.20 (1.16, 1.25)	<0.001	1.20 (1.00, 1.43)	0.050	1.23 (1.02, 1.49)	0.029	0.94 (0.56, 1.58)	0.807
Multiracial/others	0.81 (0.77, 0.85)	<0.001	1.10 (0.83, 1.47)	0.496	1.06 (0.78, 1.43)	0.715	1.71 (0.86, 3.41)	0.126
Marital status								
Married	1.10 (1.06, 1.14)	<0.001	1.00 (0.84, 1.19)	0.995	1.09 (0.89, 1.32)	0.405	0.49 (0.34, 0.70)	<0.001
Family size								
1 person	ref		ref		ref		ref	
2 persons	0.65 (0.62, 0.68)	<0.001	0.89 (0.73, 1.09)	0.258	0.86 (0.70, 1.06)	0.166	0.88 (0.58, 1.35)	0.565
>2 persons	0.61 (0.59, 0.64)	<0.001	1.29 (1.04, 1.61)	0.020	1.27 (1.00, 1.61)	0.050	1.24 (0.79, 1.93)	0.345
Education								
Less than HS	ref		ref		ref		ref	
HS	1.27 (1.22, 1.33)	<0.001	1.53 (1.17, 1.99)	0.002	1.50 (1.15, 1.95)	0.003	5.63 (0.47, 67.64)	0.172
Some college	1.46 (1.40, 1.53)	<0.001	1.67 (1.26, 2.20)	<0.001	1.62 (1.23, 2.15)	0.001	7.15 (0.61, 84.28)	0.117
College	1.84 (1.74, 1.95)	<0.001	1.98 (1.47, 2.67)	<0.001	1.93 (1.43, 2.62)	<0.001	8.02 (0.68, 93.95)	0.097
Income FPL								
<100%	ref		ref		ref		ref	
100 to <125%	2.28 (2.16, 2.41)	<0.001	2.04 (1.52, 2.73)	<0.001	1.90 (1.39, 2.59)	<0.001	3.70 (1.93, 7.07)	<0.001
125 to <200%	3.64 (3.46, 3.82)	<0.001	3.89 (3.07, 4.93)	<0.001	3.65 (2.85, 4.69)	<0.001	6.19 (3.64, 10.52)	<0.001
200 to <400%	6.07 (5.79, 6.36)	<0.001	7.49 (6.06, 9.27)	<0.001	7.24 (5.78, 9.08)	<0.001	10.70 (6.76, 16.93)	<0.001
≥400%	8.58 (8.13, 9.05)	<0.001	13.48 (10.82, 16.81)	<0.001	12.88 (10.26, 16.17)	<0.001	24.27 (13.71, 42.97)	<0.001
Chronic conditions								
Diabetes	0.78 (0.74, 0.82)	<0.001	0.75 (0.65, 0.85)	<0.001	0.74 (0.65, 0.85)	<0.001	0.84 (0.49, 1.45)	0.528
HBP	0.84 (0.81, 0.87)	<0.001	0.86 (0.77, 0.97)	0.017	0.87 (0.76, 0.98)	0.027	0.84 (0.64, 1.10)	0.195
Asthma	0.99 (0.95, 1.03)	0.575	0.98 (0.80, 1.20)	0.873	1.01 (0.80, 1.26)	0.953	0.81 (0.54, 1.22)	0.309
Any heart condition	0.56 (0.44, 0.72)	<0.001	0.69 (0.42, 1.14)	0.148	0.68 (0.41, 1.13)	0.141	0.90 (0.16, 5.06)	0.906

(continued on next page)

Table 2. AOR From Multivariable Regression for Employment Status, 2004–2019 MEPS (continued)

Characteristics	All		Veterans (all)		Veterans (males)		Veterans (females)	
	AOR	p-value	AOR	p-value	AOR	p-value	AOR	p-value
Stroke	0.51 (0.46, 0.56)	<0.001	0.64 (0.49, 0.83)	0.001	0.65 (0.50, 0.85)	0.002	0.50 (0.22, 1.16)	0.104
Emphysema	0.48 (0.43, 0.55)	<0.001	0.54 (0.40, 0.72)	<0.001	0.52 (0.38, 0.70)	<0.001	0.87 (0.33, 2.32)	0.781
Arthritis	0.71 (0.68, 0.73)	<0.001	0.77 (0.68, 0.86)	<0.001	0.77 (0.68, 0.86)	<0.001	0.73 (0.52, 1.02)	0.068
Serious hearing loss	0.79 (0.74, 0.83)	<0.001	0.80 (0.68, 0.93)	0.003	0.80 (0.68, 0.93)	0.004	0.66 (0.36, 1.19)	0.168
Health status								
Poor self-reported mental health	0.61 (0.59, 0.64)	<0.001	0.58 (0.49, 0.69)	<0.001	0.57 (0.48, 0.68)	<0.001	0.67 (0.44, 1.03)	0.066
Poor self-reported physical health	0.72 (0.69, 0.74)	<0.001	0.66 (0.58, 0.77)	<0.001	0.67 (0.58, 0.78)	<0.001	0.60 (0.41, 0.87)	0.008
PHQ-2 depression screening	0.71 (0.68, 0.75)	<0.001	0.65 (0.52, 0.81)	<0.001	0.64 (0.51, 0.80)	<0.001	0.78 (0.43, 1.43)	0.424
Kessler index (K6)								
0, no psychological distress	ref	ref	ref	ref	ref	ref	ref	ref
1–12, moderate	0.92 (0.90, 0.95)	<0.001	0.87 (0.78, 0.96)	0.005	0.87 (0.78, 0.97)	0.009	0.73 (0.55, 0.96)	0.027
≥13, severe	0.63 (0.59, 0.68)	<0.001	0.44 (0.32, 0.60)	<0.001	0.46 (0.33, 0.63)	<0.001	0.25 (0.12, 0.52)	<0.001

Note: All models were also adjusted for survey year.

AOR, Adjusted odds ratio; FPL, Federal Poverty Level; HBP, high blood pressure; HS, high school; MEPS, Medical Expenditure Panel Survey; NH, non-Hispanic; PHQ-2, Patient Health Questionnaire 2.

performed worse at work, and reported more employment barriers.²⁶

Previous work has shown that hearing plays a crucial role in facilitating effective communication and following safety regulations in the workplace.³ Poor hearing is related to lower education attainment, fewer paid work hours, lower employment, or early retirement.²² This may be true for veterans too because this study showed that veterans with serious hearing loss had lower employment rates. Hearing loss is the most common service-related disability among veterans, often caused by harmful exposure to high-intensity blasts. Because of hearing incapability, veterans may be prone to underemployment even after being highly qualified and skilled workers.³

Similar to this study’s findings, past literature has shown employment-related disparities by sex not only in the national population but also among veterans. Female veterans’ employment rates were lower, not only lower than among civilian females but also lower than among male veterans.² Female veterans face higher employment barriers, perform more poorly at work, and are less likely to be self-efficient in job search than male veterans.²⁶ A study by Gaffey and colleagues⁴ found lower prevalence of cardiovascular risk factors such as diabetes and hypertension among female veterans than among male veterans but higher prevalence of nontraditional risk factors such as insomnia, psychological symptoms, and mental health disorders. It is possible that this pattern of disease prevalence partially explains the higher dose–response relationship between psychological distress and employment status and the nonsignificant results between cardiometabolic diseases and employment status in this study and previous studies.

The Servicemen’s Readjustment Act of 1944 (G.I. Bill) created benefits that were differentially allocated to servicemen returning from World War II.²⁷ Veteran Affairs denied mortgage subsidies and restricted education and training to lower jobs to NHB individuals who otherwise were qualified to have greater skills under the G.I. Bill.²⁷ Some local benefit administrators refused NHB individuals’ applications to 4-year colleges and directed them to vocational schools.²⁷ NHB individuals disproportionately received dishonorable discharges, which further ruined their chances of receiving the benefits they could have gotten from the G.I. Bill.²⁷ Thus, there are racial disparities, and these disparities are observed when the veteran population is stratified by generation or involvement in different wars and conflicts.² The inclusion of all generations of veterans may explain some of the inconclusive results found in this study. This study also identified disparities in employment by education and income. Veterans with higher education and higher

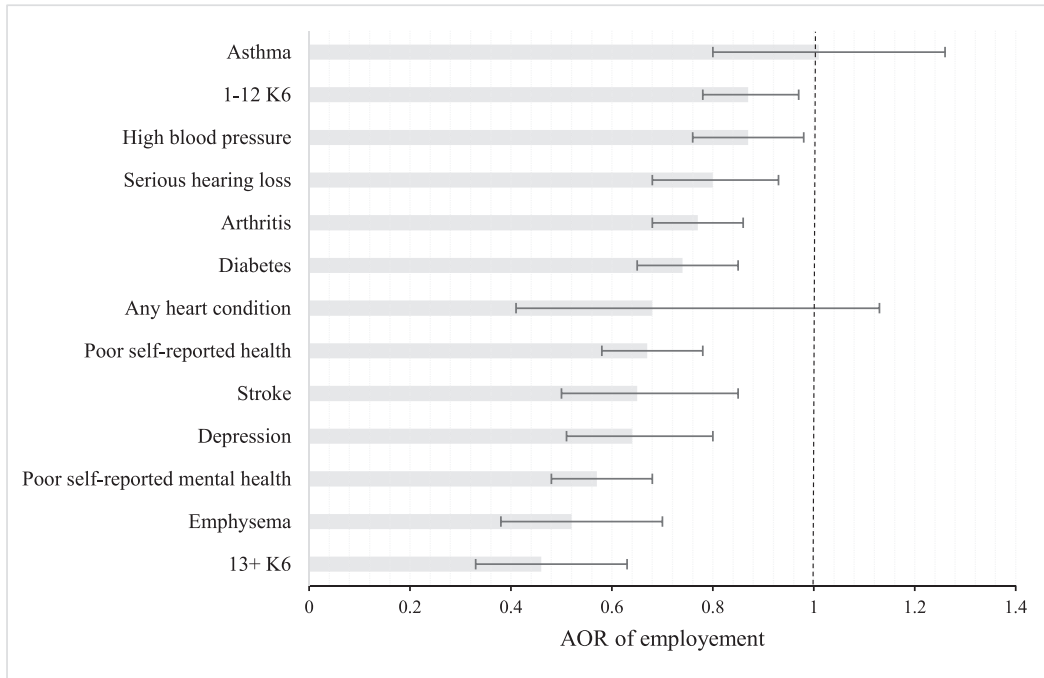


Figure 1. AORs for employment status in male veterans.

The OR with 95% CI for employment status in male veterans in this figure is shown after adjusting for age, race/ethnicity, marital status, education, income as percentage of FPL, and year in which data were collected.

FPL, Federal Poverty Level.

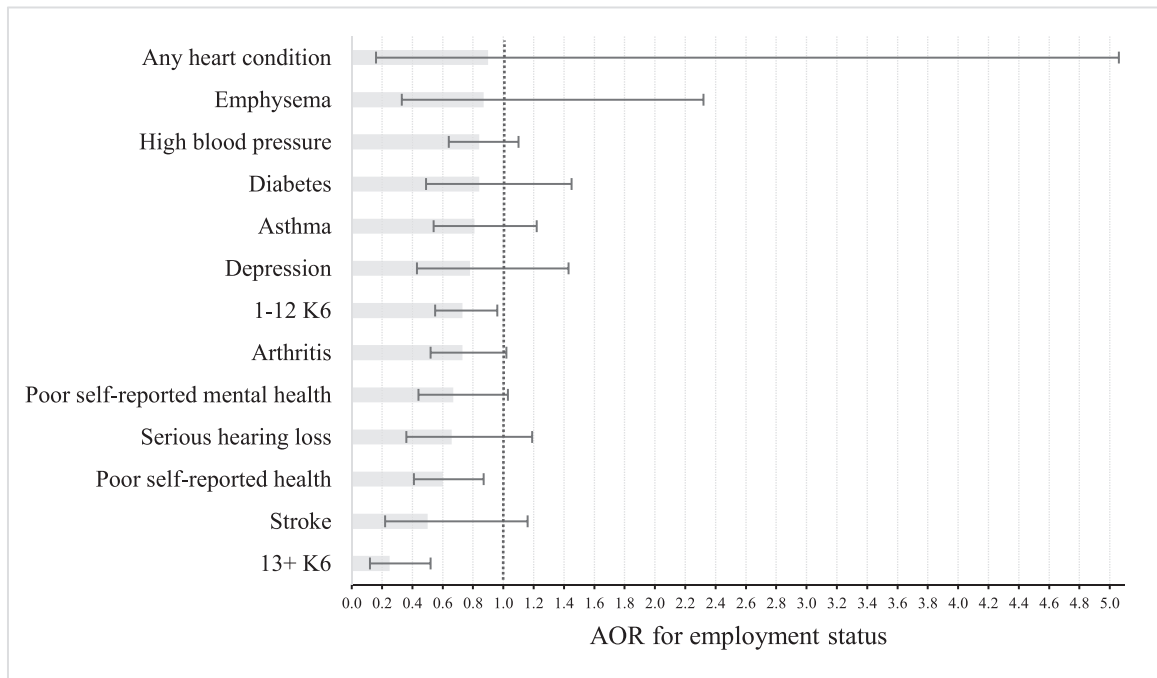


Figure 2. AORs for employment status in female veterans.

The OR with 95% CI for employment status in female veterans in this figure is shown after adjusting for age, race/ethnicity, marital status, education, income as percentage of FPL, and year in which data were collected.

FPL, Federal Poverty Level.

income were more likely to be currently employed, and such differences could also be related to impartial implementation of the G.I. Bill.

The findings from this study have important implications for healthcare providers, policy makers, and researchers. Poorer health in the veteran population may result in greater disparity in gainful employment between veterans and nonveterans. Most of the employment support programs for veterans are available to veterans with service-related mental or other disability. Although programs such as SEEK (Supportive Employment when combined with vocational rehabilitation or Engage and Keep) programs have shown to help veterans, there are still barriers in utilizing these services for veterans with mental health conditions.²⁸ In addition to service-related trauma and illnesses, having 1 or more cardiometabolic disease will tremendously increase stress on veterans. Therefore, the support programs should take more holistic approach and conduct regular mental health and psychological distress screenings in addition to effective management of diagnosed cardiometabolic conditions. Thus, this study support arguments in favor of support programs for veterans aimed at improving their physical and mental health while also helping them to successfully enter or re-enter the workforce. There is an implied social obligation toward veterans to provide and ensure a successful move into civilian life. This study could not consider factors such as geographic variation or occupational opportunities available to veterans. The mechanism through which these health conditions impact the unemployment is unknown. Future research probing such predictors are essential to understand the causes and predictors of unemployment among veterans and develop strategies that are preventative and focused on targeted interventions to reduce or better manage health conditions.

Limitations

This study provides estimates using nationally representative data and is methodologically robust. However, there are several limitations to keep in mind while interpreting the results. First, a question directly assessing veteran status was added to MEPS only in 2018. For earlier years, veteran status was derived using responses to 2 questions about active-duty status and whether the respondent had been honorably discharged from military duty. Active-duty status was not ascertained for people aged >59 years. Thus, it is safe to say that estimates in this study for veterans are conservative. In addition, in 2004, the question about honorable discharge was not fielded. Second, MEPS data are self-reported and are prone to recall and other biases commonly observed in survey data. Third, MEPS does not

collect detailed information on direct combat exposure or the time period served, which may confound the relationship between health conditions and employment status. Fourth, MEPS do not differentiate between Type 1 and Type 2 diabetes, which may influence the odds of unemployment in veterans. Fifth, as is common in large-scale, long-term surveying, some questions such as those on education, race/ethnicity, and income underwent several changes over the 16 years selected for use in this study, which may impact the results. Furthermore, it is possible that the model examining health conditions and employment among female veterans was negatively impacted by the relatively small sample size obtained for that analysis. Finally, the association between health predictors and employment cannot be interpreted causally because this is an observational study that could be affected by unobserved factors.

CONCLUSIONS

Veterans are more qualified and skilled than the civilian population because they have higher access to education and training opportunities; yet, they perform at the same level or more poorly in employment status. This study observed significant negative relationships between several health conditions and employment among the veteran population, including diabetes, HBP, stroke, emphysema, arthritis, serious hearing loss, poor self-reported mental health, poor self-reported general health, depression index, and psychological distress index. The comparison of the general U.S. population with veterans involving components of health outcomes, screening of mental and psychological stress, and individuals' understanding of their health emphasizes the importance of factors outside the control of an individual in gaining or maintaining gainful employment. More research is needed to examine the mechanisms underlying these relationships.

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CREDIT AUTHOR STATEMENT

Kavita Mosalpuria: Conceptualization, Data curation, Formal analysis, Investigation, Methodology, Validation, Visualization, Writing – original draft, Writing – review & editing. Elise V.

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