

Predicting Depression Among Veterans Using Health Care Data

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Background

- Depression is a major mental health challenge among U.S. veterans.
- In 2008, Veterans Affairs ([U.S. Department of Veterans Affairs 2016](#)) estimated that among veterans visiting primary care clinics
 - 1 in 3 veterans have some symptoms of depression
 - 1 in 5 have serious symptoms
 - 1 in 8 to 10 have major depression

Potential Causes of Depression Among Veterans

- Exposure to violence, death, and trauma
- Physical injuries ([Veterans Affairs 2015](#))
- Transition challenges ([Bond et al. 2022](#))
- Substance abuse ([National Institute on Drug Abuse 2019](#))



Depression Prediction with Healthcare Data

- Given the high prevalence of depression among veterans, it is important that healthcare providers pay special attention to their mental health
- A specialized prediction model for veterans may allow healthcare practitioners to identify veteran-specific characteristics that are associated with higher risk of depressive

Data Background

- 2005 to 2018 Centers for Disease Control and Prevention National health and Nutrition Examination Survey (NHANES)
- NHANES is a national representative survey conducted by the National Center for Health Statistics (NCHS), which includes:
 - Health exams
 - Laboratory tests
 - Dietary interviews



Data Background (cont.)

- The total dataset was filtered to include only veterans
- There are 3,929 samples and 490 predictors
- Special attention will be paid toward the memory issues and trouble sleeping predictors

Summary of Selected Demographic Characteristics

Characteristic	Overall N = 3,929 ¹	Depression Status		p-value ²
		Depressed N = 286 ¹	Not Depressed N = 3,643 ¹	
Gender				<0.001
Female	244 (6.2%)	31 (11%)	213 (5.8%)	
Male	3,685 (94%)	255 (89%)	3,430 (94%)	
Age				<0.001
Middle-aged adult	1,432 (36%)	143 (50%)	1,289 (35%)	
Older adult	2,069 (53%)	101 (35%)	1,968 (54%)	
Young adult	428 (11%)	42 (15%)	386 (11%)	
Race				0.004
Black	949 (24%)	79 (28%)	870 (24%)	
Mexican	242 (6.2%)	23 (8.0%)	219 (6.0%)	
Other and Multiracial	184 (4.7%)	19 (6.6%)	165 (4.5%)	
Other Hispanic	176 (4.5%)	20 (7.0%)	156 (4.3%)	
White	2,378 (61%)	145 (51%)	2,233 (61%)	
¹ n (%)				
² Pearson's Chi-squared test				

Summary of Selected Demographic Characteristics (cont.)

Characteristic	Overall N = 3,929 ¹	Depression Status		p-value ²
		Depressed N = 286 ¹	Not Depressed N = 3,643 ¹	
Marital Status				<0.001
Divorced	531 (14%)	59 (21%)	472 (13%)	
Married	2,479 (63%)	144 (51%)	2,335 (64%)	
Never Married	289 (7.4%)	29 (10%)	260 (7.1%)	
Partner	167 (4.3%)	10 (3.5%)	157 (4.3%)	
Separated	100 (2.6%)	13 (4.6%)	87 (2.4%)	
Widowed	354 (9.0%)	28 (9.9%)	326 (9.0%)	
Unknown	9	3	6	
¹ n (%)				
² Pearson's Chi-squared test				

Summary of Selected Demographic Characteristics (cont.)

Characteristic	Overall N = 3,929 ¹	Depression Status		p-value ²
		Depressed N = 286 ¹	Not Depressed N = 3,643 ¹	
Educational Attainment				<0.001
9-11th grade (Includes 12th grade with no diploma)	386 (9.9%)	49 (17%)	337 (9.3%)	
College graduate or above	923 (24%)	29 (10%)	894 (25%)	
High school graduate/GED or equivalent	989 (25%)	77 (27%)	912 (25%)	
Less than 9th grade	161 (4.1%)	13 (4.6%)	148 (4.1%)	
Some college	1,457 (37%)	115 (41%)	1,342 (37%)	
Unknown	13	3	10	
¹ n (%)				
² Pearson's Chi-squared test				

Summary of Selected Clinical Characteristics (cont.)

Characteristic	Overall N = 3,929 ¹	Depression Status		p-value ²
		Depressed N = 286 ¹	Not Depressed N = 3,643 ¹	
BMI				<0.001
Normal	842 (22%)	64 (23%)	778 (22%)	
Obese	1,502 (39%)	141 (50%)	1,361 (38%)	
Overweight	1,489 (38%)	71 (25%)	1,418 (39%)	
Underweight	40 (1.0%)	4 (1.4%)	36 (1.0%)	
Unknown	56	6	50	
Memory Problems	3,509 (89%)	161 (56%)	3,348 (92%)	<0.001
History of Trouble Sleeping	2,764 (70%)	85 (30%)	2,679 (74%)	<0.001
¹ n (%)				
² Fisher's exact test; Pearson's Chi-squared test				

References

- Bond, Gary R., Monirah Al-Abdulmunem, Robert E. Drake, Lori L. Davis, Thomas Meyer, Daniel M. Gade, B. Christopher Frueh, Ross B. Dickman, and Daniel R. Ressler. 2022. "Transition from Military Service: Mental Health and Well-Being Among Service Members and Veterans with Service-Connected Disabilities." *The Journal of Behavioral Health Services & Research* 49 (3): 282–98.
<https://doi.org/10.1007/s11414-021-09778-w>.
- National Institute on Drug Abuse. 2019. "Substance Use and Military Life Drugfacts."
<https://nida.nih.gov/publications/drugfacts/substance-use-military-life>.
- U.S. Department of Veterans Affairs. 2016. "VA Research on DEPRESSION."
https://www.research.va.gov/pubs/docs/va_factsheets/depression.pdf.
- Veterans Affairs. 2015. "The Psychological Impact of Physical Battle Scars."
<https://www.research.va.gov/currents/winter2015/winter2015-17.cfm#:~:text=Veterans%20with%20negative%20body%20image,to%20a%20new%20VA%20study>.