Sumberg, L.L.[1,2], Georg, M.W.[1,2], Dempsey, C.L.[1,2], Mohammed, S.M.[1,2], Ao, J.[1,2], Aliaga, P.A.[1,2], Haller, K.[1,2], Zuromski, K.L.[3], Nock, M.K.[3], Heeringa, S.G.[4], Kessler, R.C.[5], Stein, M.B.[6,7], Benedek, D.M.[1], & Ursano, R.J.[1]

1) Center for the Study of Traumatic Stress, Department of Psychiatry, Uniformed Services University of the Health Sciences, Bethesda, MD; 2) Henry M. Jackson Foundation for the Advancement of Military Medicine, Inc., Bethesda, MD; 3) Department of Psychology, Harvard University, Cambridge, MA; 4) Institute for Social Research, University of Michigan, Ann Arbor, MI; 5) Department of Health Care Policy, Harvard Medical School, Cambridge, MA; 6) Department of Psychiatry and School of Public Health, University of California San Diego, La Jolla, CA; 7) VA San Diego Healthcare System, San Diego, California

INTRODUCTION

STARRS-LS

Study to Assess Risk and Resilience in Servicemembers - Longitudinal Study

- Suicide deaths represent a serious public health concern, particularly among service members. The Department of Defense reported that the rate of suicide deaths gradually increased to 34.8 per 100,000 active-duty Army service members in 2023.[1]

- Research suggests that physical health conditions are associated with increased risk of suicidal behaviors in U.S. Army service members and veterans. Pain, sleep disorders, combat injury, and traumatic brain injury were associated with an increased risk of suicide death in veterans.[2] History of recent injuries had a stronger association with suicide attempt in those with a history of mental health disorder among active-duty U.S. Army soldiers.[3]

- The purpose of this study is to identify whether physical health conditions increase the risk of suicide death among U.S. Army Soldiers, as reported by supervisor and next-of-kin informants.

METHODS

Sample

- Data were from the Soldier Health Outcomes Study-B (SHOS-B), a case-control psychological autopsy study which compared U.S. Army suicide decedents (n = 135) to two types of controls: propensity-score (PS) matched (n = 128) on 22 known sociodemographic and military characteristics and soldiers who reported suicide ideation in the past year (SI) (n =108). Interviews were conducted with next-of-kin (NOK) and Army supervisors (SUP) informants. Multivariable logistic regression analyses examined history of past 30 day physical health conditions, after controlling for deployment status and years in military service.[4,5]

Measures

- We developed a psychological autopsy interview using a measure-development procedure that involved: (a) extensive literature reviews of prior autopsy studies; (b) review of measures used in these prior studies; and (c) to the extent possible, mirroring the questions asked of family members and supervisors to facilitate comparisons across informants.[6,7]

Analyses

- Multivariable logistic regression analysis predicted suicide death using all variables significant in univariable analyses.

- Coefficients were exponentiated in logistic models to create ORs with 95% CIs.

- X^2 tests were performed when fitting the models.

- All tests were two sided and p-value <0.05 was significant.

- SAS Software version 9.4 used for all analyses.[8]

RESULTS

Table 1: Multivariable Analyses of Next-of- Kin Reports of Physical Health Conditions and Suicide Risk

Survey Item		
Past 30 Day Health Problems	OR	(CI 95%)
Memory problems	2.3	(1.03, 5.19)
χ2, *p*-value	**4.115, 0.0425**	
Feeling restless, tense, wound up, or on edge	2.2	(1.09, 4.55)
χ2, *p*-value	**4.859, 0.0275**	
Being easily fatigued	2.5	(1.22, 5.06)
χ2, *p*-value	**6.324, 0.0119**	

Notes: Bolded values are significant at p-value <0.05 (cases vs controls)
Model controlled for deployment status (never, currently, previously) ,and number of years of active service (1-4, 5-8, 9+)
Abbreviations: OR = Odds Ratio, CI = Confidence Interval, χ2 = Wald Chi-square

- NOK identified suicide decedents were more likely to report memory problems (OR=2.3 [95% CI=1.03, 5.19] χ²=4.1), feel restless, tense, wound up or on edge (OR=2.2 [95% CI=1.09, 4.55] χ²=4.9), or be easily fatigued (OR=2.5 [95% CI=1.22, 5.06] χ²=6.3) compared to PS controls.

Fig 1. Army Enterprise Marketing Office (2017). Physical Therapy [Image]. Retrieved form https://www.dvidshub.net/ [9,10]

Table 2: Multivariable Analyses of Supervisor Reports of Physical Health Conditions and Suicide Risk

Survey Item	Model Excluding b1b	
Past 30 Day Health Problems	OR	(CI 95%)
Past 30 day Pain	0.3	(0.17, 0.60)
χ2, *p*-value	**12.299, 0.0005**	
Poor appetite or overeating	4.7	(1.15, 19.06)
χ2, *p*-value	**4.651, 0.0310**	
Feeling restless, tense, wound up, or on edge	3.1	(1.60, 6.13)
χ2, *p*-value	**11.155, 0.0008**	

Notes: Bolded value significant at p-value <0.05 (cases vs controls)
Model controlled for deployment status (never, currently, previously)
Abbreviations: OR = Odds Ratio, CI = Confidence Interval, χ2 = Wald Chi-square

- SUP reported suicide decedents were less likely to report physical pain (OR=0.3 [95% CI=0.17, 0.60] χ²=12.3), and more likely to report poor appetite or overeating (OR=4.7 [95% CI=1.15, 19.06] χ²=4.7), to feel restless, tense, wound up or on edge (OR=3.1 [95% CI=1.60, 6.13] χ²=11.2) compared to PS controls.

CONCLUSION

- Our findings suggest supervisor and next-of-kin similarly identified physical health conditions in the month prior to suicide death. Surprisingly, pain was not associated with increased risk of suicide death for NOK or SUP.

- Future investigations should explore possible explanations for the relationship between pain and suicide risk in service members and investigate the relationship between other physical health conditions and suicide risk.

- One of the major limitations of the study is the relatively small sample size, limiting our power to detect smaller effects to test for interactions.

Scan for QR code for information about the Center for the Study of Traumatic Stress:
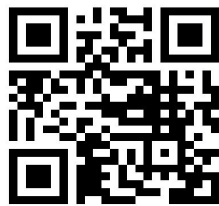
REFERENCES

1. U.S. Department of Defense. (2024). Annual Report on Suicide in the Military. https://www.dspo.mil/Portals/113/2024/documents/annual_report/ARSM_CY23_final_508c.pdf.
2. McCarthy, J. F., Bossarte, R. M., Katz, I. R., Thompson, C., Kemp, J., Hannemann, C. M., Nielson, C., & Schoenbaum, M. (2015). Predictive Modeling and Concentration of the Risk of Suicide: Implications for Preventive Interventions in the US Department of Veterans Affairs. Am J Public Health, 105(9), 1935-1942. https://doi.org/10.2105/ajph.2015.302737 .
3. Ursano, R. J., Kessler, R. C., Naifeh, J. A., Herberman Mash, H. B., Nock, M. K., Aliaga, P. A., Fullerton, C. S., Wynn, G. H., Ng, T. H. H., Dinh, H. M., Sampson, N. A., Kao, T.-C., Heeringa, S. G., & Stein, M. B. (2018). Risk Factors Associated With Attempted Suicide Among US Army Soldiers Without a History of Mental Health Diagnosis. JAMA Psychiatry, 75(10), 1022-1032. https://doi.org/10.1001/jamapsychiatry.2018.2069 .
4. Ursano, R. J., Colpe, L. J., Heeringa, S. G., Kessler, R. C., Schoenbaum, M. and Stein, M. B. (2014). The Army Study to Assess Risk and Resilience in Servicemembers (Army STARRS). Psychiatry, 77(2), 107-119. doi: 10.1521/psyc.2014.77.2.107.
5. Nock, M. K., Dempsey, C. L., Aliaga, P. A., Brent, D. A., Heeringa, S. G., Kessler, R. C., … Benedek, D. (2017). Psychological Autopsy Study Comparing Suicide Decedents, Suicide Ideators, and Propensity Score Matched Controls: Results from the Study to Assess Risk and Resilience in Service Members (Army STARRS). Psychological Medicine, 1-12. doi:10.1017/S0033291717001179.
6. Conner, K. R., Beautrais, A. L., Brent, D. A., Conwell, Y., Phillips, M. R. & Schneider, B. 2011. The next generation of psychological autopsy studies: Part 1. Interview content. Suicide and Life-Threatening Behavior, 41, 594-613.
7. Conner, K. R., Beautrais, A. L., Brent, D. A., Conwell, Y., Phillips, M. R. & Schneider, B. 2012. The next generation of psychological autopsy studies: Part 2. Interview procedures. Suicide and Life-Threatening Behavior, 42, 86-103.
8. SAS Institute Inc. (2018) SAS (Version 9.4) [Computer software].
9. Army Enterprise Marketing Office (2017). Physical Therapy [Image]. Retrieved form https://www.dvidshub.net/.
10. Michel Sauret (2023) Soldiers stand watch at sunrise during Saber Junction 23 [Image]. Retrieved form https://www.dvidshub.net/.