

Longitudinal relationship of combat exposure with mental health diagnoses in the MHS

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Background

- Combat exposure is associated with mental and physical health disorders and functional impairment¹
- Mental health (MH) diagnoses such as adjustment and anxiety disorders have received little research attention yet may reflect important post-deployment sequelae
- Most studies investigating mental health disorders and combat deployment have utilized cross-sectional research designs and few studies have examined the effects of combat exposure, an important risk variable¹
- Purpose of this study was to investigate the effects of combat exposure on the acquisition of MH diagnoses over an observation period of four years using post-deployment and healthcare administration data

Methods

- Retrospective longitudinal study utilized multiple administrative Military Health System datasets compiled for all individuals who entered the U.S. Army active duty service from FY2005 to FY2015
- Excluding prior MH diagnoses, total eligible cohort of 391,557 soldiers was stratified into three mutually exclusive groups according to their deployment status after two years in service:
 - Deployment with combat exposure (Combat Exposure group)
 - Deployment with no combat exposure (No Combat Exposure group)
 - Not Deployed
- Deployment referred to Iraq, Afghanistan, and Kuwait (>30 days), and combat exposure was defined by responses to combat exposure items on the Post Deployment Health Assessment
- Outcomes of interest were new MH diagnoses (defined by one outpatient or one inpatient encounter reflecting relevant ICD-9 code) grouped into five categories – posttraumatic stress (PTSD), anxiety, adjustment, mood, and substance use (SUD) disorders
- Survival and unadjusted descriptive analyses were conducted; hazard ratios (adjusted for age and gender) were calculated for each MH category plus a MH summary variable over four years across the three groups

Results

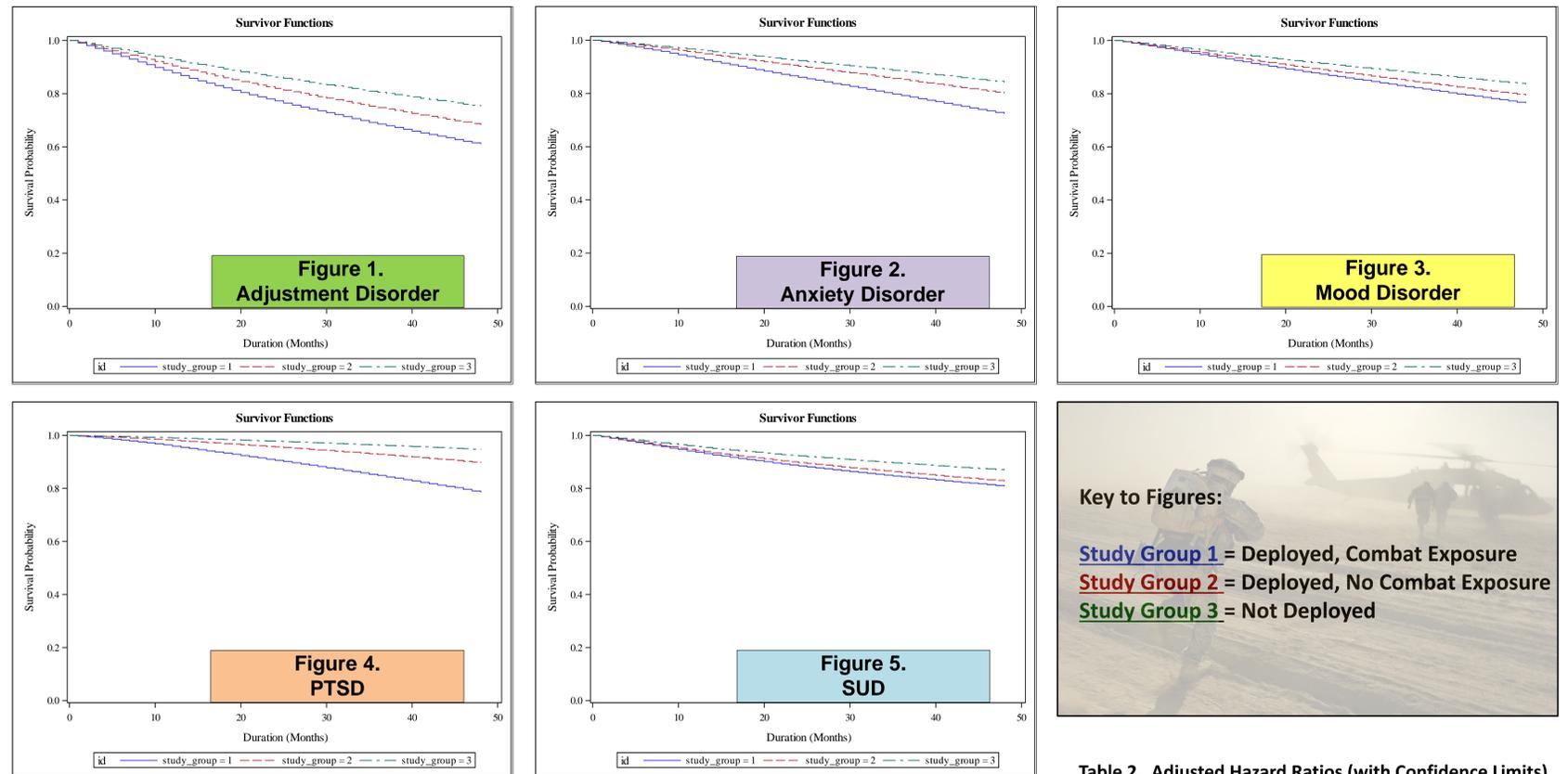
- Significant differences in demographic and military characteristics among groups
 - Combat exposed group were younger, less likely to be married
 - Combat exposed group had higher rate of males, White SMs, combat occupation, and number of deployments

Table 1. Associations between Deployment Status and MH Disorders

Sample Description (Unadjusted)					Model-based Cumulative Failure Proportions Over 48 Months ^{a, b}		
Diagnosis by Group		Sample Size	Number with Disorder	Person-years	Incidence Rate /100 PYs	Percent %	Std Err
Adjustment Disorder	Deployed, Combat Exposure	38,915	13,329	109,421	12.2	39.0	2.7
	Deployed, No Combat Exposure	75,341	19,753	202,169	9.8	31.7	1.9
	Not Deployed	178,031	28,170	389,814	7.2	24.7	1.4
Anxiety Disorder	Deployed, Combat Exposure	46,065	8940	121,581	7.4	27.6	2.6
	Deployed, No Combat Exposure	87,783	11,912	222,222	5.4	19.9	1.7
	Not Deployed	204,222	17,751	427,710	4.2	15.8	1.2
Mood Disorder	Deployed, Combat Exposure	46,924	7786	122,109	6.4	23.6	2.4
	Deployed, No Combat Exposure	85,926	12,796	218,991	5.8	20.6	1.7
	Not Deployed	198,922	19,272	418,969	4.6	16.4	1.2
PTSD	Deployed, Combat Exposure	49,465	6555	126,525	5.2	21.4	2.5
	Deployed, No Combat Exposure	96,000	5719	233,219	2.5	10.3	1.3
	Not Deployed	225,459	5486	454,210	1.2	5.3	0.8
SUD	Deployed, Combat Exposure	46,046	7528	120,381	6.3	19.1	2.1
	Deployed, No Combat Exposure	85,629	11,588	217,750	5.3	17.2	1.5
	Not Deployed	203,082	15,512	423,098	3.7	13.0	1.1
Any Mental Health ^c	Deployed, Combat Exposure	33,830	22,816	105,231	21.7	55.7	2.5
	Deployed, No Combat Exposure	67,969	34,219	197,536	17.3	46.8	1.9
	Not Deployed	179,429	53,294	399,388	13.3	38.5	1.5

^aExcludes prior MH dx for that category ^bAdjusted for age, sex ^cFirst diagnosis for any of 5 MH categories above

Figures 1-5. Survival Rates for MH Diagnoses by Deployment Status



Key to Figures:

- Study Group 1** = Deployed, Combat Exposure
- Study Group 2** = Deployed, No Combat Exposure
- Study Group 3** = Not Deployed

Table 2. Adjusted Hazard Ratios (with Confidence Limits) over 48 months for MH Diagnoses by Deployment Status Group (all p<.0001)

Mental Health Diagnosis	Deployed with Combat Exposure vs. No Combat Exposure	Deployed with Combat Exposure vs. Not Deployed	Deployed with No Combat Exposure vs. Not Deployed
Adjustment Disorder	1.30 (1.27-1.33)	1.74 (1.71-1.78)	1.34 (1.32-1.37)
Anxiety Disorder	1.46 (1.42-1.50)	1.88 (1.84-1.93)	1.29 (1.26-1.32)
Mood Disorder	1.17 (1.13-1.20)	1.50 (1.46-1.54)	1.29 (1.26-1.32)
PTSD	2.22 (2.14-2.30)	4.43 (4.27-4.59)	1.99 (1.92-2.07)
SUD	1.12 (1.09-1.16)	1.52 (1.48-1.56)	1.35 (1.32-1.38)
Any Mental Health	1.29 (1.27-1.31)	1.67 (1.67-1.70)	1.30 (1.28-1.32)

Conclusions

- Over a four year follow up period, combat exposure in the first two years of military service was associated with substantially and significantly higher relative risks of a wide range of MH diagnoses, compared to deployment with no combat exposure and no deployment
- Adjustment disorders had the highest incidence rates over four years for all groups, followed by anxiety and mood disorders
- PTSD had a relatively low incidence rate but the highest relative risk for both deployed groups
- Unadjusted analyses yielded incidence rates that were one third to one fourth less (lower bound) than population failure estimates based on survival analyses, which modeled likely rates of diagnoses over four years, taking high attrition into account (upper bound)
- Study strengths include longitudinal design, direct comparison of combat exposure with no combat exposure in deployed groups, direct comparison of raw data with population modeling, and investigation of a wide range of mental health disorders
- Study limitations include reliance on MH diagnoses which may not fully capture symptoms or experiences

Reference

¹Ramchand, R., Rudavsky, R., Grant, S., Tanielian, T., & Jaycox, L. (2015). Prevalence of, risk factors for, and consequences of posttraumatic stress disorder and other mental health problems in military populations deployed to Iraq and Afghanistan. *Curr Psychiatry Rep*, 17(5), 37. doi: 10.1007/s11920-015-0575-z



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