

PTSD & Motor Vehicle Crash Hospitalizations among recent Veterans enrolled in VA Healthcare

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Background: Post-deployment injuries

- Increased risk of post-deployment fatal injury
 - Combat Veterans of past wars
 - Veterans of Iraq and Afghanistan
- Non-fatal injury of any era not well established.
- Many post-deployment injury-related deaths attributable to motor vehicle crashes (MVCs).
 - Vietnam and Gulf War Veterans: mortality from MVC injuries higher among conflict Veterans than among non-conflict Veterans
- Five year period of increased risk of MVC fatalities:
 - Conflict Veterans at increased risk.
 - After 5 years, risk drops.

Background: Posttraumatic Stress Disorder (PTSD)

- PTSD is an anxiety disorder involving:
 - Witnesses a traumatic event
 - Life-threat
 - Serious injury
 - Sexual violation
 - Increased risk of death.
- PTSD prevalent among returning Iraq and Afghanistan War Veterans:
 - 23% in our cohort

Gaps in the literature:

- Posttraumatic stress disorder (PTSD) is one potential cause of injury events
- PTSD severity associated with aggressive driving
- Popular media reports on PTSD and driving difficulties
- Overall, insufficient empirical research on causal pathways from combat experience to post-deployment injury.

Objective:

Examine the potential role of PTSD as a risk factor for MVC-related hospitalizations among Iraq and Afghanistan War Veterans within the first five years after deployment.

Methods: Study Overview, Data, Measures

- National, historical cohort study
- Data:
 - VHA National Patient Care Database (NPCD): ICD-9
 - OEF/OIF/OND Roster
- Variables:
 - Hospitalization for MVC-related injuries (e-codes 810-825)
 - PTSD (309.81)
 - Demographic information (Education, Age, Gender, Race/ethnicity, Marital status)
 - Limited deployment information (Number of deployments, Military branch, Military component)
 - Information collected after deployment (Miles from home to nearest VA, Service Connection Status)

Methods: Study Design & Population

All OEF/OIF/OND Veterans who enrolled in the VA in year 1 post-deployment, 2001-2011. Five years of follow-up.

Military Roster Data



NPCD- VA Administrative Data

≥ 5 VA visits total,
 ≥ 1 visit in Year 1 &
 ≥ 1 Visit in Years 4
or 5 Post-deployment



"Frequent VA Users"

Alive during 5
years of follow-
up



Received any
VA diagnoses

Final cohort: 119,409 Veterans

Methods: Analysis

- Descriptive analysis
 - Frequencies and percentages of Veteran characteristics by MVC hospitalization
- Univariate & Multivariate Relative Risk Analysis
 - **Primary Independent Variable:** One or more inpatient or outpatient visits for PTSD within post-deployment year one
 - **Dependent Variable:** One or more inpatient stays for MVC-related injuries within post-deployment years one through five.
 - Adjusted for covariates
- Inpatient Analysis
 - **Secondary Independent Variable:** One or more inpatient PTSD Dx in post-deployment year one
- Temporality:
 - PTSD and other covariates in post-deployment year 1
 - MVC hospitalizations in years 1-5
- Software: SAS 9.3

Results: Descriptive Analysis

- Veterans hospitalized for MVCs were more likely to be:
 - Ages 18 to 24 (**51% hospitalized vs. 33% non-hospitalized**)
 - Male (**94% vs. 87%**)
 - White (**55% vs. 53%**)
 - Never married (**60% vs. 48%**),
 - High school diploma or less (**89% vs. 77%**)
 - Were deployed once (66% vs. 61%)
 - 50% + Service Connection Status (**69% vs. 41%**)
 - Reserves or Guard (for Hospitalized group) vs. Active Duty (**41 vs. 57%**)

Results: Relative Risk Analysis

Relative risk of hospitalizations for MVC-related injuries among Iraq and Afghanistan War Veterans who were “Frequent Users” of VHA Healthcare 2001-2011, by inpatient/outpatient PTSD diagnosis.

Post-deployment hospitalization for MVC (Inpatient, Years 1-5)

Characteristic	Hospitalized (n=378, 0.32%)		Not Hospitalized (n=118,965; 99.68%)		Univariate Model (n=119,343; 100%) RR (95% CI)	Multivariate Model RR §(95% CI)
	n	%	n	%		
PTSD						
>=1 Dx	111	(29.4%)	27,767	(23.3 %)	1.4 (1.1-1.7)	1.0 (0.8-1.2)
No Dx	267	(70.6%)	91,198	(76.7%)	Referent	Referent

Results: Inpatient only Analysis

Relative risk of hospitalizations for MVC-related injuries among Iraq and Afghanistan War Veterans who were “Frequent Users” of VHA Healthcare, 2001-2011, by *inpatient* PTSD diagnosis status.

Post-deployment hospitalization for MVC (Inpatient, Years 1-5)

Characteristic	Hospitalized		Not Hospitalized		Univariate Model (n=119,343; 100%) RR (95% CI)	Multivariate Model RR (95% CI)
	N	%	n	%		
PTSD						
>=1 Dx	35	9.3%	1,739	1.5 %	6.8 (4.8-9.5)	4.4 (3.1-6.2)
No Dx	343	90.7%	117,226	98.5%	Referent	Referent

Conclusions

- **Outpatient & Inpatient**
 - Increased risk (+40%) among those with PTSD Dx compared to without Dx.
 - Neutral relative risk after adjustment for covariates
- **Inpatient Treatment**
 - Increased risk (+580%) compared to those without inpatient PTSD care
 - Maintain increased risk (+340%) after adjustment for covariates
- **For outpatient, non-PTSD Factors may instead be driving MVC-risk**
 - *Demographics*
 - *Deployment characteristics*
 - *Other concurrent diagnoses*

Future Studies

- Elucidate other risk and protective factors for hospitalizations due to MVCs:
 - Traumatic Brain Injuries (TBI)
 - Adaptive driving skills from combat zone
 - Coping
 - Community support during transition to civilian life
- Understand the differences between Veterans with inpatient and outpatient care for PTSD:
 - Financial means
 - Able to take time off from work
 - Higher Service Connection Status
 - Severity of symptoms
- Analyze MVC trends in non-VA settings
- Time to event analysis from inpatient PTSD Dx to outcome

Thank you!

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