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

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October 15, 2013. OPHA Conference

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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.

<table>
<thead>
<tr>
<th>Characteristic</th>
<th>Hospitalized (n=378, 0.32%)</th>
<th>Not Hospitalized (n=118,965; 99.68%)</th>
<th>Univariate Model (n=119,343; 100%)</th>
<th>Multivariate Model ( ^{(95% \text{ CI})} )</th>
</tr>
</thead>
<tbody>
<tr>
<td>PTSD</td>
<td></td>
<td></td>
<td>RR (95% CI)</td>
<td>RR ( ^{(95% \text{ CI})} )</td>
</tr>
<tr>
<td>&gt;=1 Dx</td>
<td>111 (29.4%)</td>
<td>27,767 (23.3%)</td>
<td>1.4 (1.1-1.7)</td>
<td>1.0 (0.8-1.2)</td>
</tr>
<tr>
<td>No Dx</td>
<td>267 (70.6%)</td>
<td>91,198 (76.7%)</td>
<td>Referent</td>
<td>Referent</td>
</tr>
</tbody>
</table>
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.

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</tr>
<tr>
<td>&gt;=1 Dx</td>
<td>35 (9.3%)</td>
<td>1,739 (1.5 %)</td>
<td>6.8 (4.8-9.5)</td>
<td>4.4 (3.1-6.2)</td>
</tr>
<tr>
<td>No Dx</td>
<td>343 (90.7%)</td>
<td>117,226 (98.5%)</td>
<td>Referent</td>
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</tbody>
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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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