The relationship between chronic pain & suicide-related outcomes

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Disclosures

- Lisham Ashrafioun has no conflicts of interest to report
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- Rob Bossarte has no conflicts of interest to report
- Sara Warfield has no conflicts of interest to report
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Overview

- Review literature regarding the relationship between pain and suicidal thoughts and behavior
- Present findings from the Behavioral Health Autopsy Program as it relates to pain among Veteran suicide decedents
- Present preliminary analyses on suicide attempts among Veterans seeking VHA specialty pain services
- Review chronic pain and suicide in West Virginia
- Present findings from WVU hospital system predicting suicide attempts among patients who have chronic pain
Poll #1

• What is your primary role in VA?
  – Student, trainee, or fellow
  – Clinician
  – Researcher
  – Manager or policy-maker
  – Other
Poll #2

- What is your area of expertise in the following areas?
  - Pain
  - Suicide
  - Neither
  - Both
  - I dabble in both
Suicide

- Over 42,000 suicides across the United States
- Veterans die by suicide at a higher rate compared to civilians

CDC; Department of Veterans Affairs, 2016;
Pain

- Veterans are at-risk of developing chronic pain
- Estimated cost of chronic pain is over $500 billion
- MSD cohort – 5,237,763 (55%) Veterans w/ at least 1 MSD diagnosis

IOM, 2011; Goulet et al., 2016
Pain is associated with increased risk of suicidal thoughts and behaviors

• Pain included as an indication for assessment of risk for suicide in the VA/DoD guidelines

• Among Veterans, pain conditions are associated with increased risk of suicide

• Meta-analysis: Death wishes ($z = 3.47$), suicidal ideation ($z = 5.77$), suicide planning ($z = 3.36$), suicide attempts ($z = 4.29$), suicide ($z = 2.34$)

• Among National VA Crisis Line callers, pain was the perceived reason for calling in 10% of over 35,000 calls

Calati et al., 2015; Ilgen et al., 2013, Tang & Crane, 2006; Rasmussen et al., 2016
Pain-related factors associated with suicide risk

- Pain catastrophizing
- Pain severity and pain interference
- Perceived burdensomeness
- Opioid Therapy
  - Risk factors - higher doses, sedative co-prescriptions,
  - Protective factors – facilities increased follow-up after initiating prescriptions

Edwards et al., 2006; Ilgen et al., 2016; Im et al., 2015; Kowal et al., 2014; Tang & Crane, 2006;
Behavioral Health Autopsy Program

- Implemented in 2012 by VHA’s Suicide Prevention program

- Collects information on all Veteran deaths by suicide reported to VHA clinicians and suicide prevention coordinators (SPCs)
  - Standardized chart reviews
  - Interviews of family members of Veteran suicide decedents
  - Review of care completed by SPCs at local facilities

- Report was generated in November 2015 from information collected from December 2012 to June 2015

Department of Veterans Affairs, 2015
Behavioral Health Autopsy Program

- Family Interviews (144 interviews representing 139 Veterans)
  - Over two-thirds reported the Veteran suicide decedent experienced pain

<table>
<thead>
<tr>
<th>Table 3. Respondent’s Knowledge of Veterans’ Physical Health</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
</tr>
<tr>
<td><strong>Veteran’s general health</strong></td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td>Poor</td>
</tr>
<tr>
<td>55 (40.7)</td>
</tr>
<tr>
<td>40 (29.6)</td>
</tr>
<tr>
<td>40 (29.6)</td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td><strong>Veteran had physical challenges or mobility issues</strong></td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td>Yes</td>
</tr>
<tr>
<td>79 (58.5)</td>
</tr>
<tr>
<td>56 (41.5)</td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td><strong>Veteran had problems with pain</strong></td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td>Yes</td>
</tr>
<tr>
<td>93 (68.9)</td>
</tr>
<tr>
<td>37 (27.4)</td>
</tr>
<tr>
<td>Not indicated</td>
</tr>
</tbody>
</table>

VETERANS HEALTH ADMINISTRATION
Behavioral Health Autopsy

- Chart reviews

**Figure 5: Risk Factors**

<table>
<thead>
<tr>
<th>Pain</th>
<th>Unsecured firearm</th>
<th>Relationship problem</th>
<th>Hopelessness</th>
<th>Ability Decline</th>
<th>Financial/Lost/Strain</th>
</tr>
</thead>
<tbody>
<tr>
<td>50.2%</td>
<td>34.4%</td>
<td>31.4%</td>
<td>30.8%</td>
<td>27.6%</td>
<td>27.6%</td>
</tr>
</tbody>
</table>

**Pain level**
- Severe 30%
- Mild 22%
- Moderate 48%
BHAP Recommendations

• Effective assessment and treatment of pain involves close collaboration and open communication between providers and Veterans across settings.

• Clinicians should consider benefits of behavioral management techniques for pain management and to collaborate with pain clinics when available.

• Carefully consider pros and cons of pharmacological treatments for pain during treatment planning, particularly in Veterans with past or current alcohol or substance use disorders.
Veterans seeking VHA specialty pain services

- **Step 3** – Veteran continues experiencing significant impairment and disability due to pain
  - ↑ medical and/or psychiatric comorbidity and complexity
- **Specialty pain services** - Arout et al. (2017)
  - Comparable levels of medical conditions
  - Higher rates of psychiatric disorders
  - Greater number of opioid prescriptions

Adapted from National Pain Strategy
Suicide attempts among Veterans seeking VHA specialty pain services

- **Cohort** – all Veterans with a 420 stop code alive during FY 2012 to FY 2014 (n = 231,729)
- **Corporate Data Warehouse**
  - Diagnoses
  - Age, gender
  - Pain Numeric Rating Scale scores
- **Suicide Prevention Application Network (SPAN) database**
Suicide attempts among Veterans seeking VHA specialty pain services

<table>
<thead>
<tr>
<th>Conditions</th>
<th>n (%)</th>
<th>Conditions</th>
<th>n (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Depression</td>
<td>97,674 (42.2)</td>
<td>Migraines</td>
<td>16,592 (7.2)</td>
</tr>
<tr>
<td>Alcohol Use Disorder</td>
<td>30,701 (13.2)</td>
<td>Other headaches</td>
<td>25,507 (11.0)</td>
</tr>
<tr>
<td>Drug Use Disorder</td>
<td>29,998 (12.9)</td>
<td>Psychogenic</td>
<td>6,202 (2.7)</td>
</tr>
<tr>
<td>PTSD</td>
<td>45,733 (19.7)</td>
<td>Neuropathy</td>
<td>7,524 (3.2)</td>
</tr>
<tr>
<td>Arthritis</td>
<td>152,614 (65.9)</td>
<td>Fibromyalgia</td>
<td>19,317 (8.3)</td>
</tr>
<tr>
<td>Back pain</td>
<td>188,721 (81.4)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

- Pain scores – 5.2% reporting no pain; 47.7% reporting score of 7 or higher
Suicide attempts

- Rate – 1,086/100,000
## Risk factors of suicide attempts

<table>
<thead>
<tr>
<th>Risk Factor</th>
<th>Adjusted odds ratios</th>
<th>95% CI</th>
</tr>
</thead>
<tbody>
<tr>
<td>Male</td>
<td>0.80</td>
<td>0.67-0.94</td>
</tr>
<tr>
<td>Age</td>
<td>0.97</td>
<td>0.97-0.98</td>
</tr>
<tr>
<td>Max pain intensity score on index visit</td>
<td>1.05</td>
<td>1.02-1.08</td>
</tr>
<tr>
<td>Depression</td>
<td>2.20</td>
<td>1.90-2.51</td>
</tr>
<tr>
<td>Alcohol use disorder</td>
<td>2.19</td>
<td>1.90-2.51</td>
</tr>
<tr>
<td>Drug use disorder</td>
<td>2.24</td>
<td>1.95-2.57</td>
</tr>
<tr>
<td>PTSD</td>
<td>1.40</td>
<td>1.22-1.59</td>
</tr>
<tr>
<td>Other anxiety disorder</td>
<td>1.41</td>
<td>1.24-1.59</td>
</tr>
<tr>
<td>Medical comorbidity</td>
<td>1.07</td>
<td>1.02-1.08</td>
</tr>
</tbody>
</table>
Pain scores by attempt status

- No attempt
- Attempt
### Pain scores and pain conditions

<table>
<thead>
<tr>
<th>Time period of max pain score</th>
<th>n</th>
<th>Adjusted OR</th>
<th>95% CI</th>
</tr>
</thead>
<tbody>
<tr>
<td>Index</td>
<td>111,068</td>
<td>1.05</td>
<td>1.02-1.08</td>
</tr>
<tr>
<td>Previous week</td>
<td>127,907</td>
<td>1.07</td>
<td>1.05-1.09</td>
</tr>
<tr>
<td>Previous 30 days</td>
<td>169,385</td>
<td>1.08</td>
<td>1.06-1.10</td>
</tr>
<tr>
<td>Previous 90 days</td>
<td>210,642</td>
<td>1.11</td>
<td>1.09-1.13</td>
</tr>
<tr>
<td>Previous 180 days</td>
<td>225,762</td>
<td>1.16</td>
<td>1.14-1.19</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Condition</th>
<th>Adjusted OR</th>
<th>95% CI</th>
<th>Condition</th>
<th>Adjusted OR</th>
<th>95% CI</th>
</tr>
</thead>
<tbody>
<tr>
<td>Arthritis</td>
<td>0.84</td>
<td>0.77-0.92</td>
<td>Psychogenic</td>
<td>1.08</td>
<td>0.89-1.31</td>
</tr>
<tr>
<td>Back pain</td>
<td>0.65</td>
<td>0.58-0.72</td>
<td>Neuropathy</td>
<td>0.99</td>
<td>0.77-1.27</td>
</tr>
<tr>
<td>Migraine</td>
<td>1.12</td>
<td>0.98-1.27</td>
<td>Fibromyalgia</td>
<td>1.06</td>
<td>0.93-1.22</td>
</tr>
<tr>
<td>Headaches</td>
<td>1.08</td>
<td>0.96-1.21</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Next steps and limitations

Next steps
- Treatment utilization
- Medication use
- Suicide deaths

Limitations
- Suicide attempt data
- Medical record diagnoses
- Challenging to know exactly what treatment patients are receiving at their index visit
Take home points

• Public health approach to suicide prevention includes addressing pain

• Communication is key – with other providers, with Veterans, and about suicide risk

• Assessing the effect of pain management strategies on suicide risk
  – Not excluding individuals experiencing suicidal ideation
  – Including suicide risk outcomes

• Explicitly addressing suicide in psychosocial interventions
The relationship between chronic pain & suicide-related outcomes in West Virginia

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\textsuperscript{3} WVU School of Public Health
West Virginia

• Population of WV is around 1.85 million
• Approximately 13.6% of homes in WV are occupied by veterans ¹
• WV is the second most elderly state in the country ²
  – 1 in 3 elder West Virginians is in fair or poor health
  – Approximately 45% of WV elders have a disability compared to 37% nationally
• Suicide rates are higher in West Virginia than national rates ³
  – Ranked 12th

1. Housing Assistance Council Tabulations of the Census Bureau's 2010-2014 American Community Survey (ACS) and 2013 Home Mortgage Disclosure Act (HMDA) Data.
Suicide Rates

Source: American Foundation for Suicide Prevention

Suicide Rates in the United States

West Virginia

US
Chronic pain

• The prevalence of chronic pain in the US is estimated to be 11.2% 6

• Experts on pain recommend opioid therapy for people with chronic pain, since it has been recognized to relieve pain and improve functioning 7-8

• Recommended that less than 100 MMEs/day are prescribed to reduce the risk of overdosing 9

Chronic pain and public health

- Medical schools devote 9 hours to pain management
  - veterinarians receive roughly 87 hours  
- Pain 5th vital sign → increase in opioid pain relievers (OPRs)
- In 2012, health care providers wrote enough OPR for every American adult to have a bottle of pills  
- From 1997 to 2007 the milligram per person of OPR increased from 74 milligrams to 369 milligrams  
  - Increased more than 4x

Opioids in West Virginia

• In 2013, **10.3%** of West Virginia residents received a prescription for **more than 100 MMEs** a day.\(^{13}\)

• In West Virginia there were **929.3** OPR prescriptions for every **1,000** residents in West Virginia (including those used for MAT) in 2013.\(^{8}\)

• WV continues has the highest opioid overdose death in the nation at a rate of **19.8** per **100,000**.\(^{14}\)

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Methods

• Data obtained from WVU’s state-wide integrated data repository (IDR) hosted by West Virginia Clinical and Translational Science Institute (CTSI)
  – 6 hospitals
  – 61 outpatient facilities
  – 1,960,090 patients 18+

• Connects with other hospital systems
  – University of Kentucky
  – University of Cincinnati
  – Mount Sinai
Measures

Patients with identified ICD-9/10 codes that met inclusion criteria:

• Patient from 2014-2016
• 18+ years old
• **Suicide attempt**
  – E950-E959
• **Chronic pain**
  – **Back pain**: 720.0-724.9
  – **Arthritis**: 710.0-739.9
  – **Migraines**: 346.0-346.9
  – **Headaches**: 784.0 and 307.81
  – **Psychogenic Pain**: 307.80 and 307.89
  – **Neuropathy**: 256.60, 355.0, 355.9, 356.0, 357.2, and 357.9
  – **Fibromyalgia**: 729.1
Analysis

- Conducted chi-square tests and correlation using R 3.3.1

- Tested trends and annual percent change in suicide among WVU patient population with chronic pain
  - Used JoinPoint to conduct analysis

- Analyzed three previous years of hospital data to predict subsequent year of suicide attempts among chronic pain patients
Patients in WVU Hospital System

- 89.25% No chronic pain diagnosis
- 10.75% Chronic pain

Suicide attempts among all WVU Hospital Patients

- 0.32% Suicide attempts
- 99.68% All patients

Suicide attempts among patients with chronic pain

- 36.55% Suicide
- 63.45% Chronic pain
Average age of patient in WVU Database, 2014-2016

- All patients
- Chronic pain patients
- Suicide attempt
- Chronic pain & suicide attempt

Gender of patients in WVU Database, 2014-2016

- All patients
- Chronic pain patients
- Suicide attempts
- Chronic pain & suicide attempts

- Female
- Male

P-value <0.05
# Comparison of select symptoms/conditions among WV patients, 2014-2016

<table>
<thead>
<tr>
<th>Condition</th>
<th>All patients</th>
<th>Chronic pain patients</th>
<th>Suicide attempts</th>
<th>Chronic pain &amp; suicide attempts</th>
</tr>
</thead>
<tbody>
<tr>
<td>Headache</td>
<td>45%</td>
<td>47%</td>
<td>49%</td>
<td>56%</td>
</tr>
<tr>
<td>Malaise or fatigue</td>
<td>46%</td>
<td>45%</td>
<td>42%</td>
<td>47%</td>
</tr>
<tr>
<td>Nicotine dependence</td>
<td>39%</td>
<td>36%</td>
<td>41%</td>
<td>44%</td>
</tr>
</tbody>
</table>

All conditions have a p-value less than 0.05.
WVU Patients with mood affective disorders, 2014-2016

In the US it is estimated that 19.3% of the population will have an affective disorder during their life.¹⁵

Opioid medications prescribed to WVU patients, 2014-2016

Any opioid

Acetaminophen based opioid

Hydrocodone

Oxycodone

All patients
Chronic pain patients
Suicide attempts
Chronic pain & suicide attempts

All have p-value <0.001
Hospitalization Rate in West Virginia, 2014-2016

- Chronic pain & suicide attempt (46.02 APC)
- Suicide attempt (44.78 APC)
- Chronic pain (18.26 APC)

<table>
<thead>
<tr>
<th>Year</th>
<th>Hospitalization Rate per 100,000</th>
</tr>
</thead>
<tbody>
<tr>
<td>2014</td>
<td>747.06</td>
</tr>
<tr>
<td>2015</td>
<td>867.97</td>
</tr>
<tr>
<td>2016</td>
<td>1042.91</td>
</tr>
</tbody>
</table>

Chronic pain & suicide attempt (46.02 APC)
Suicide attempts among WVU patients, 2014-2016

Frequency of suicide

Year

2014 2015 2016 2017

All suicide attempts

Chronic pain & suicide attempt

West Virginia University
Injury Control Research Center
Suicide attempts among WVU hospital patients diagnosed with Chronic Pain

Predicted number of suicide attempts among chronic pain patients in the next year is approximately 1034.
Discussion

• There is a statistically significant correlation between the number opioids dispensed in WV and rate of suicide attempt (-0.97).
• These findings underscore the importance of routine screening for associated risk factors like mood disorders among chronic pain patients.
• However, pain management strategies should be balanced by awareness of risk and mental health services.
• Tools for health care providers, such as the SEMP guidelines, should address what to do when patients may be identified to be at risk.
Next steps

• The relationships between suicide attempt, chronic pain and opioid use are unclear.
• Future research should investigate the complex relationships between chronic pain, psychiatric comorbidities, and suicide risk.
• Examine gender differences among chronic pain patients and suicide.
Questions/comments

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Backup slides
Suicide in WV

• On average, one person dies every day in this state

• In 2010 it cost WV over $307 million of combined lifetime medical and work lost
  – Average of $1.1 million per suicide death

• Suicide is the 11th leading cause of death overall in West Virginia
  – 2\textsuperscript{nd} leading cause of death for ages 10-34
  – 4\textsuperscript{th} leading cause of death for ages 35-44

• 3x as many people die by suicide in WV annually than by homicide

Public health initiatives

**Chronic Pain**
- Public health initiatives such as the Chronic Pain Guidelines – CDC
- Access to Opioid Antagonists Bill in 2015
  - Increases the number of patients treated with controlled substances for the clinic to be designated pain management clinic (50%-60%)

**Suicide**
- WV Council for the Prevention of Suicide
  - Develop and implement public awareness of suicide
- Adolescent Suicide Prevention and Early Intervention (ASPEN): 3-year project
  - Focus on suicide awareness, prevention, and early intervention
- Prevent Suicide WV
  - Collaborative program between WVCPS and ASPEN
## WEST VIRGINIA 2016 CONTROLLED SUBSTANCE DOSES

<table>
<thead>
<tr>
<th>Rank</th>
<th>Drug Category</th>
<th>Schedule</th>
<th>No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Hydrocodone Products</td>
<td>II</td>
<td>60.15 Million</td>
</tr>
<tr>
<td>2.</td>
<td>Oxycodone Products</td>
<td>II</td>
<td>36.18 Million</td>
</tr>
<tr>
<td>3.</td>
<td>Tramadol Products</td>
<td>IV</td>
<td>35.68 Million</td>
</tr>
<tr>
<td>4.</td>
<td>Alprazolam Products</td>
<td>IV</td>
<td>32.14 Million</td>
</tr>
<tr>
<td>5.</td>
<td>Clonazepam Products</td>
<td>IV</td>
<td>17.39 Million</td>
</tr>
<tr>
<td>6.</td>
<td>Lorazepam Products</td>
<td>IV</td>
<td>15.83 Million</td>
</tr>
<tr>
<td>7.</td>
<td>Diazepam Products</td>
<td>IV</td>
<td>8.83 Million</td>
</tr>
<tr>
<td>8.</td>
<td>Zolpidem Products</td>
<td>IV</td>
<td>8.22 Million</td>
</tr>
<tr>
<td>9.</td>
<td>Amphetamine Products</td>
<td>II</td>
<td>7.82 Million</td>
</tr>
<tr>
<td>10.</td>
<td>Buprenorphine Products</td>
<td>III</td>
<td>7.12 Million</td>
</tr>
<tr>
<td>11.</td>
<td>Methylphenidate Products</td>
<td>II</td>
<td>4.74 Million</td>
</tr>
<tr>
<td>12.</td>
<td>Codeine Products</td>
<td>III</td>
<td>4.56 Million</td>
</tr>
<tr>
<td></td>
<td>All Other Products</td>
<td>II-IV</td>
<td>28.54 Million</td>
</tr>
<tr>
<td><strong>TOTAL</strong></td>
<td></td>
<td>II-IV</td>
<td><strong>267.2 Million</strong></td>
</tr>
</tbody>
</table>
WV is one of 12 states that participate in the Prescription Behavior Surveillance System (PBSS) conducted by Brandeis PDMP Center of Excellence.

Source: 2016 West Virginia Controlled Substances Monitoring Program Report
Suicide Death Rate in West Virginia By County, 1999-2014

*CDC data used from multiple years were used (1999-2014) in order to get enough data to display county rankings

During this time, 85% of all counties in WV had a higher rate of suicide than the national average.
2008-2014, West Virginia
Age-adjusted Death Rates per 100,000 Population
All Injury, Suicide, All Races, All Ethnicities, Both Sexes, All Ages
Annualized Age-adjusted Rate for West Virginia: 15.54

Reports for All Ages include those of unknown age.
* Rates based on 20 or fewer deaths may be unstable. These rates are suppressed for counties (see legend above); such rates in the title have an asterisk.
The standard population for age-adjustment represents the year 2000, all races, both sexes.

Produced by: the Statistics, Programming & Economics Branch, National Center for Injury Prevention & Control, CDC
Data Sources: NCES National Vital Statistics System for numbers of deaths; US Census Bureau for population estimates.
Race of Patients in WVU Hospital Database, 2014-2016

- All patients
- Chronic Pain Patients
- Suicide
- CP Suicide

- Unknown
- Black
- White

West Virginia University
Injury Control Research Center
Suicide attempts among WVU patient population

Frequency of suicide

Year

2014: 197
2015: 209
2016: 240
2017: 263
2018: 202
2019: 262
2020: 286
2021: 302
2022: 378
2023: 422
2024: 563
2025: 563
2026: 449
2027: 393
2028: 414
2029: 460
2030: 440

Suicide attempts

Suicide among chronic pain patients

2017* predicted