Liquid Courage or Potent Poison: Alcohol and Suicidality

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Agenda

1) Describe the epidemiology of acute use of alcohol and suicide in U.S.

2) Summarize controlled data on risk for suicide and suicide attempts associated with acute use of alcohol

3) Identify important unanswered questions in the acute alcohol – suicidal behavior relationship
Background

- >38,000 deaths in the US (CDC; WISQARS, 2010)
- 10th leading cause of death (CDC; WISQARS 2010)
- 5th leading cause of years of potential life lost (CDC; WISQARS 2010)
- 40% of suicide attempts and 37% of suicides involve acute use of alcohol (Cherpitel et al., 2004)
NVDRS

• CDC’s National Violent Death Reporting System (NVDRS).

• State-based active surveillance system that provides a detailed account of violent deaths that occur in the participating states.

• Data gathered from coroner/medical examiner (C/ME) records; police reports; death certificates; toxicology laboratories; crime laboratories; and Alcohol, Tobacco, Firearms and Explosives (ATF) firearm trace reports.

• In sum, a large and demographically well-characterized database with toxicology information, CME, and law enforcement reports.
States participating in NVDRS
NVDRS data elements

Death Certificate
- Sex
- Age
- Marital status
- Race
- Education
- Veteran status
- County of residence
- Suicide method

Suicide Circumstances
- Mental health problems
- Depressed mood
- Chronic alcohol dependence/problem
- Substance dependence/problem
- Other precipitating circumstances

Toxicology reports
- Blood alcohol level
Rates of alcohol positivity and acute intoxication by race/ethnicity

<table>
<thead>
<tr>
<th>Race/Ethnicity</th>
<th>AI/AN</th>
<th>Hispanic</th>
<th>White</th>
<th>Black</th>
<th>Asian/PI</th>
</tr>
</thead>
<tbody>
<tr>
<td>BAC+ ≥.08</td>
<td>47%</td>
<td>38%</td>
<td>33%</td>
<td>26%</td>
<td>23%</td>
</tr>
</tbody>
</table>

Note: Alcohol positivity denotes BAC > 0
Suicide decedents with BAC ≥ .08 by age and gender

Suicide decedents with BAC ≥ .08 by race/ethnicity and gender

Note: AI/AN: American Indian/Alaska Native

Suicide decedents with BAC ≥ .08 by education and gender

Suicide decedents with BAC ≥ .08 by method and gender

Factors associated with intoxication

<table>
<thead>
<tr>
<th>Suicide method</th>
<th>AOR (95%CI) Men</th>
<th>AOR (95%CI) Women</th>
</tr>
</thead>
<tbody>
<tr>
<td>Firearm</td>
<td>1.76 (1.61 - 1.93)</td>
<td>1.68 (1.46 - 1.93)</td>
</tr>
<tr>
<td>Sharp or blunt instrument</td>
<td>0.66 (0.51 - 0.86)</td>
<td>0.69 (0.37 - 1.26)</td>
</tr>
<tr>
<td>Poison</td>
<td>1.00 (Reference)</td>
<td>1.00 (Reference)</td>
</tr>
<tr>
<td>Hanging or suffocation</td>
<td>1.38 (1.25 - 1.53)</td>
<td>1.48 (1.25 - 1.75)</td>
</tr>
<tr>
<td>Fall</td>
<td>0.75 (0.56 - 1.00)</td>
<td>1.51 (1.01 - 2.27)</td>
</tr>
<tr>
<td>Drowning</td>
<td>1.38 (0.99 - 1.94)</td>
<td>1.61 (1.05 - 2.47)</td>
</tr>
</tbody>
</table>

AOR: adjusted odd ratio; CI: confidence interval. Significant findings at p<0.05 are in yellow. Models adjusted for age, race/ethnicity, veteran status, educational attainment, suicide method, and metropolitan status.
TABLE 3 - Blood Alcohol Content (BAC, g/dl) among Suicides with BAC Positive Results

<table>
<thead>
<tr>
<th></th>
<th>Firearm M(SD) BAC</th>
<th>Hanging M(SD) BAC</th>
<th>Poisoning M(SD) BAC</th>
<th>Total M(SD) BAC</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Sex</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Male</td>
<td>0.16 (0.11)</td>
<td>0.14 (0.10)</td>
<td>0.12 (0.11)</td>
<td>0.15 (0.11)</td>
</tr>
<tr>
<td>Female</td>
<td>0.16 (0.11)</td>
<td>0.15 (0.10)</td>
<td>0.11 (0.10)</td>
<td>0.13 (0.11)</td>
</tr>
<tr>
<td><strong>Age</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>18-24</td>
<td>0.14 (0.10)</td>
<td>0.12 (0.09)</td>
<td>0.08 (0.07)</td>
<td>0.13 (0.10)</td>
</tr>
<tr>
<td>25-44</td>
<td>0.16 (0.11)</td>
<td>0.14 (0.09)</td>
<td>0.12 (0.10)</td>
<td>0.15 (0.10)</td>
</tr>
<tr>
<td>45-64</td>
<td>0.16 (0.11)</td>
<td>0.14 (0.10)</td>
<td>0.12 (0.11)</td>
<td>0.15 (0.11)</td>
</tr>
<tr>
<td>65+</td>
<td>0.13 (0.12)</td>
<td>0.12 (0.16)</td>
<td>0.11 (0.14)</td>
<td>0.12 (0.13)</td>
</tr>
<tr>
<td><strong>Race/Ethnicity</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>White</td>
<td>0.16 (0.11)</td>
<td>0.14 (0.09)</td>
<td>0.12 (0.11)</td>
<td>0.14 (0.11)</td>
</tr>
<tr>
<td>Black</td>
<td>0.13 (0.11)</td>
<td>0.12 (0.08)</td>
<td>0.11 (0.09)</td>
<td>0.12 (0.10)</td>
</tr>
<tr>
<td>AI/AN</td>
<td>0.18 (0.15)</td>
<td>0.17 (0.08)</td>
<td>0.15 (0.11)</td>
<td>0.17 (0.12)</td>
</tr>
<tr>
<td>Asian/PI</td>
<td>0.11 (0.09)</td>
<td>0.11 (0.12)</td>
<td>0.11 (0.13)</td>
<td>0.11 (0.11)</td>
</tr>
<tr>
<td>Hispanic</td>
<td>0.16 (0.09)</td>
<td>0.15 (0.13)</td>
<td>0.13 (0.12)</td>
<td>0.15 (0.11)</td>
</tr>
<tr>
<td><strong>Death investigation system</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>ME</td>
<td>0.16 (0.11)</td>
<td>0.14 (0.10)</td>
<td>0.11 (0.11)</td>
<td>0.14 (0.11)</td>
</tr>
<tr>
<td>Coroner</td>
<td>0.15 (0.12)</td>
<td>0.14 (0.09)</td>
<td>0.12 (0.12)</td>
<td>0.14 (0.11)</td>
</tr>
<tr>
<td>Mixed C/ME</td>
<td>0.16 (0.10)</td>
<td>0.14 (0.09)</td>
<td>0.13 (0.10)</td>
<td>0.15 (0.10)</td>
</tr>
</tbody>
</table>

BAC: Blood alcohol content; AIAN: Alaska Natives/American Indian; Asian/PI: Asian/Pacific Islander; ME: Medical examiner; C/ME: Coroner/medical examiner. Note: 5% of the cases with BAC positive were missing the results.

NVDRS Limitations

State variability in BAC testing

Decedents suspected of not having a chronic alcohol problem may not have been BAC tested

Data limited to 16 states

Death certificate data elements subject to misclassifications
NVDRS Strengths

• Only national dataset available to examine blood alcohol levels among suicide decedents

• Accurate, timely, and comprehensive surveillance data with unrivaled toxicology information.

• NVDRS states are comparable to the entire US population (Gibbons et al. 2012)

• NVRDS provides data to design effective policies and programs to reduce the incidence of suicide.
Acute Alcohol and Suicidal Behavior: Controlled Data

Much controlled data on risk for suicide and suicide attempts associated with alcohol use disorder (Conner & Ilgen, 2011).

Limited controlled data on risk for suicidal behavior associated with acute use of alcohol (Borges & Loera, 2010).

**Acute Alcohol and Suicide Attempt:**
OR ~ 6.2 to 9.6
- Borges et al., 2004
- Borges et al., 2006
- Powell et al., 2001
- Vinson et al., 2003

**Acute Alcohol and Suicide:**
OR ~ 5.9, Branas et al., 2011 (firearm)

**Dose-Response Relationship:**
- Borges et al., 2006
- Branas et al., 2011
- Powell et al., 2001
Future Research

– Secondary analyses of data are ongoing (e.g., NVDRS)
– Other types of research is also needed:
  • Basic research
    – Mechanisms (Disinhibition? Aggression? Precipitating conflicts and other acute stressful life events? Myopia?)
    – Informative phenotype?
  • Applied research
    – Drinking Settings (Drinking alone)?
    – Motivations for alcohol use (Courage?)
    – “Natural recovery” from suicidal thoughts or intention as a result of detoxification (When is someone safe to be discharged after they sober up?)
  • Treatment development research
    – Brief interventions (Tailored to ED)?
Challenges to Research

- Ethical/safety concerns rule out or significantly impact the design of studies:
  - Naturalistic research (e.g., consenting individuals in the ER while they are intoxicated, allowing suicidal ideation identified during ecological momentary assessment to run its course)
  - Experimental research (e.g., simulations of stress or provocation in patients with suicidal ideation, giving alcohol to individuals who have attempted suicide while drinking)

- Challenges to accurately studying suicidal crises while intoxicated using retrospective methods (e.g., timeline followback)

- Potential biases in laboratory assessments (e.g., delays in assessment of BAC in self-poisonings)
Summary

A substantial minority of suicides are preceded by acute use of alcohol, with high mean drinking levels

Use of alcohol acutely and dosage prior to suicide varies by age, sex, race/ethnicity, and method

Available controlled data show an association of acute use of alcohol and suicidal behavior and suggest a dose-response relationship

There are numerous unanswered questions including mechanisms, motives, settings, recovery time, and treatment

There are methodological and ethical challenges to addressing such questions
References


